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ABSTRACT

During the 1974-75 school year, all second and third grade pupils in California were tested in reading achievement, and all pupils in grades 6 and 12 were tested in the basic skills of reading, written expression, and mathematics. The Reading Test: Second and Third Grades was the instrument used to assess reading achievement; it was developed specifically for use in California. Reading achievement in the primary grades continued to surpass publishers' norms by a small margin. Pupils in grade 6 were administered a new test constructed as part of the revised California Assessment Program: the Survey of Basic Skills: Grade 6. All areas tested showed increases, however scores were still slightly below national averages. The Survey of Basic Skills: Grade 12 was also used for the first time. Scores continued on a downward trend and are not well below publisher's norms. Since both sixth and twelfth grade tests lacked norms, a special study determined how students would have done on the tests previously used. Test results are described in terms of the average percentage of questions answered correctly for the areas of reading, written expression, and mathematics and for separate skill areas within each area. Illustrative test questions are given. Authorities reviewed the results and commented on the meaning of the results for California instructional programs. Conclusions and recommendations are given for each grade level and content area. (RC)

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Student Achievement in California Schools

1974-75 Annual Report

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California Assessment Program

California Assessment Program

Student Achievement in California Schools

1974-75 Annual Report

Prepared Under the Direction of
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1975

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SUMMARY OF THE ANNUAL REPORT

During the 1974-75 school year, all second and third grade pupils in California, 293,060 and 295,373 respectively, were tested in reading achievement, and all pupils in grades six (338,913) and twelve (243,048) were tested in the basic skills of reading, written expression, and mathematics.

Reading achievement scores for pupils in grades two and three have been improving steadily since the first statewide testing was conducted in 1966. For the past several years, the scores of California pupils have exceeded national averages. The results for 1974-75 show that the level of performance was maintained in grade two and improved again in grade three. These results were based on the second year in which the Reading Test had been used for grades two and three; this new test was constructed specifically to assess the broad range of reading programs in California's public schools. In grade two the average percent of questions answered correctly remained at 67 percent, and at grade three it climbed from 80 to 81 percent.

Pupils in grade six were administered a new test constructed as part of the revised California Assessment Program: the Survey of Basic Skills: Grade 6. Although this test does not have national norms, a special study was conducted to determine how California pupils would have performed if they had taken the test previously used at the sixth grade level; the Comprehensive Tests of Basic Skills (CTBS). Scores on the CTBS had been declining for several years, stabilized in 1973-74, and then registered a sharp upturn in 1974-75. All areas--reading, written expression, and mathematics--showed a four to six percentile rank increase; however, the scores for California students were still slightly below national averages. Reading was highest, with a percentile rank of 48; mathematics was next at 44, and language was lowest at 43.

A parallel test, the Survey of Basic Skills: Grade 12, was administered to all twelfth grade students for the first time. A special study estimated the performance of California students on the test used for the previous five years, the Iowa Tests of Educational Development. Student performance on that test continued its gradual but consistent downward trend and is now well below the publisher's norms. Language (written expression) is again the lowest area, with the median California pupil scoring at the 32nd percentile rank. The scores in mathematics and reading are both at the 41st percentile rank. One facet of this comparability study estimated California performance on two other standardized tests with more recent

norms. The pattern of performance is similar but lower on both tests, ranging from a percentile rank of 25 in language on one test to a high of 41 in mathematics.

The major portion of this report on statewide testing for 1974-75 is devoted to an analysis of the results on the new tests. Results are described in terms of the average percentage of questions answered correctly for the areas of reading, written expression, and mathematics and for each of the separate skill areas within reading, written expression, and mathematics. Illustrative test questions are given to show a sample of skills assessed. Recognized authorities in each of the disciplines reviewed the results and commented upon the meaning of the results for California instructional programs. Their conclusions and implications are given for each grade level and content area.

Statewide performance on the new tests was analyzed separately for a variety of subgroups of pupils and schools. High test scores were most likely to be achieved by pupils who spoke only English, and whose parents had more education and were employed in the professions. Schools having high test scores at one grade level were extremely likely to have high scores at other grade levels, and schools with less mobile pupil populations were likely to have higher scores than those with highly transient pupils; however, it seems likely that any correlation between pupil mobility and test scores was due to the fact that schools in higher socioeconomic communities tended to have less mobile student populations.

INTRODUCTION TO A NEW KIND OF TESTING REPORT

This report presents the first annual results of the California statewide testing program, as revised by 1972 legislation. It includes information which differs substantially from that of previous reports--for example:

- A new type of test score is used, the "average percent correct score."
- Sample test questions are given to illustrate the nature and range of skills demonstrated by California students.
- Information is presented for a variety of skill areas within each of the major content areas of reading, written expression, and mathematics.
- Recognized authorities in each professional field have presented their interpretations of the results for each of the content areas by identifying areas of satisfactory performance and areas that need attention.
- The results are relevant to instructional programs in California, but they cannot be compared directly with national norms. Test results are presented, however, from special studies designed to compare the performance of California students with the national norms of several published standardized tests.

A Year of Transition

The new assessment program has now been implemented. In design, development, and procedures it is unique in the nation. The goals of developing an assessment program that (1) is relevant to California schools; (2) covers the full range of instructional objectives; (3) provides program diagnostic information at the local and state levels; and (4) takes a minimum of testing time have all been realized. Nevertheless, the amount of information yielded by the first year administration is somewhat limited. The results presented may best be thought of as a baseline or benchmark for noting progress in future years. The usefulness of the results of the program will increase sharply as information in future years points to areas of growth or decline.

Background and Assumptions

The 1974-75 statewide testing program had its foundation in two legislative acts: (1) the California School Testing Act of 1969, a revision of a 1961 law which first required an achievement testing program in the public schools; and (2) the Miller-Unruh Basic Reading Act, which originally required reading

tests in grades one, two, and three. The testing program was revised by 1972 legislation, resulting in major changes.

The changes in the statewide testing program rest on the principle that an efficient state testing program must be limited in scope--that is, limited to the task of furnishing useful information to state-level policy and decision-makers. The program cannot meet all the many additional information needs of local school district personnel. Assessment information needed at the classroom and school levels is best collected by local school personnel. It should be noted, however, that all students at a given grade level in all schools are tested, and every effort is made to provide to school district personnel very detailed and analytic reports which can be used to supplement their locally obtained information.

Bases for Revision of the Program

Three major problems were addressed by the revision of the statewide testing program:

1. Test breadth. The incomplete match between the relatively narrow range of skills measured by any one published standardized test, on the one hand, and the variety of instructional programs in California schools, on the other, made it difficult to assess the skills of California students or the effectiveness of the programs with any degree of assurance or fairness. Furthermore, it was not possible to assess the relative strengths and weaknesses of California students in order to have an indication of how instructional programs should be redirected, since the standardized tests being used yielded only total scores.

2. Testing time. Previous testing instruments required an inordinate amount of pupil time for the testing process--inordinate, at least, in relation to the usefulness of the results. The use of a new testing technique called matrix sampling has now reduced the amount of testing time at certain grade levels from as much as three and one-half hours to 30 minutes. Under this sampling method, all students at a grade level in all schools are tested, but each student takes only a portion of the total test. Results for an individual student cannot be obtained, but quite accurate estimates of the overall performance of groups of students can be computed.

3. National norms. Since 1962, the first year of statewide testing in California, all tests adopted for use have been commercially published instruments with "national" norms. The new tests that are described in this report were constructed specifically for use in California schools and were used in 1974-75 for the first time. National norms are not available for these tests. The decision to develop tests which would not have national norms stemmed from several known problems associated with published standardized tests and their national norms, as used in a statewide assessment program.

No single test is given to all students in the country. Of necessity, a publisher's norm is therefore only an estimate of what the distribution of scores would be like if, in fact, the test had been taken by all students in the United States. For this reason, norms vary from publisher to publisher, sometimes in the extreme. In our own recent history the Stanford Reading Test was administered to all second grade pupils in the 1969-70 school year, and the median California pupil scored at the 38th percentile of that publisher's norms. In the following year the Cooperative Primary Reading Test was administered to all second grade pupils. The median California pupil scored at the 50th percentile of that publisher's norms. The different result was clearly a reflection more of the difference in norms than of the difference in reading achievement. Hence, one cannot indiscriminately discuss "norms"; some are more accurate reflections of national averages than others. The difficulty, of course, is knowing which ones are most accurate.

A second problem with norms is that they are not updated very often. For instance, the Cooperative Primary Reading Test was normed during the 1965-66 school year. As a result, when those norms are referred to, it must be clearly understood that the comparisons being made are to the publisher's estimate of what scores on that test would have been if administered to all pupils in the country nine years ago. If reading scores for the nation had dropped continuously since that time, an "average" score for California pupils might, in fact, reflect achievement far above current nationwide averages.

Another problem with the use of standardized tests in a statewide assessment program is that they rarely yield more than a total score and one, two, or three subscores for various skill areas within a content area. It is not only essential that an assessment program cover all the objectives within an area but also that it provide separate information for each of the key areas of learning. This specificity is a necessary prerequisite to the use of the test results in improving programs. Published standardized tests cannot meet this criterion.

The new state assessment instruments provide this broad information, but they do not provide parallel national normative information. The gain of program diagnostic information outweighs the loss of national comparative information.

Nevertheless, comparisons to national averages are not only interesting but also useful as a basis for judging the overall relative effectiveness of California's instructional programs. Furthermore, California law (Education Code Sections 5779 and 12850) requires that such information be made available. Consequently, a plan to provide this information has been developed. Every three or four years the tests in use will be equated to one or more standardized tests with the most current national norms available. The effect of this equating process will be to show how the performance of California students compares with the best and latest estimates of pupil performance on a national level. The last section of this report shows how this system will work.

Development of the New Tests

The development of tests related to California goals and objectives followed a rigorous procedure. The major steps are outlined below:

1. Statewide committees of content area experts were formed and charged with the task of translating and delineating the general goals found in state adopted curriculum frameworks into more specific objectives appropriate for assessment.

2. These specific objectives, or test content specifications, were then reviewed by school districts in California for completeness and relevance to their instructional programs. The revised specifications served as the basic guidelines for selecting and developing pools of test items. These documents were subsequently printed and distributed to all school districts under the general title Test Content Specifications.

3. From the initially large pools of items, teams of classroom teachers selected the items that were most appropriate for California students.

4. These items were then reviewed by linguists and minority group testing experts for any subtle biases against students of different language or cultural backgrounds.

5. The final pool of items, several hundred at each grade level, was then divided into several short tests or forms--from 10 to 18 per grade level. All test forms were made equivalent in difficulty and coverage of major skills.

Unique Aspects of this Report

New Ways of Reporting Test Results

The statistic used in this report to indicate the achievement levels of California pupils is the "average percent correct score." For a given set of test questions, this number is the percentage of correct test responses, with one response being equal to the answer of one student to one question, and the total number of responses being equal to the number of students multiplied by the number of items on the test. For example, if three students took a test with ten questions and if each of the three answered five of the ten questions correctly, the total number of responses would be 30, the total number correct would be 15, and the average percent correct score would be 50. It can also be said that the average student answered 50 percent of the questions correctly; or that, on the average, 50 percent of the questions were answered correctly.

It is hoped that the use of this type of score and the simultaneous presentation of illustrative test questions or exercises will add to the clarity and usefulness of the findings. It should be easier, as a result, to see what California students are able to do. Unfortunately, this method is

so new in educational evaluation and assessment that guidelines and rule-of-thumb benchmarks are not available. Each reader will have to evaluate the adequacy of the results. The emphasis is on establishing realistic and necessary levels of actual competence rather than on the traditional comparing of results to a national norm.

It will be noted that most of the average percent correct scores hover around the 60s and 70s; however, some are down in the 30s, and some are up in the 90s. Two points must be kept in mind in interpreting these figures:

1. The major reason that the average scores are in the 60s and 70s, rather than the 90s, is that the aims of the instructional programs at each level in California schools go beyond the basic, minimal levels of performance expected of all students. In reading, for example, those skills which are mastered by most students by the end of the fourth grade are not tested in the sixth grade. Testing time is too valuable and the scoring and processing too expensive to justify gathering information which does not add to what is already known about California students.

2. It should be obvious that high scores in particular subskill areas do not necessarily indicate effective programs, nor low scores the opposite. Some tasks are inherently more difficult. In reading, for example, it is not considered outstanding that by the end of grade three, nearly all students can immediately recognize and read certain short words--nor is it at all disappointing that only about 60 percent can answer certain questions requiring a student to recognize cause and effect relationships among sentences.

Use of Expert Interpretations

The overall results and especially the differences among various subcontent or skill areas have been reviewed by special advisory committees of highly respected educators in each field. It is hoped that their comments about the adequacy of the findings and their discussion of the implications for shifts in program emphasis will be helpful both to the professional educator and the lay citizen concerned with education in California. Obviously, however, not all readers will agree with the opinions of the specialists. Any discussion or inquiry which is stimulated by these opinions is useful in that it will help to clarify the proper objectives of the schools and foster realistic expectations of them.

ACHIEVEMENT IN READING AT GRADES TWO AND THREE

Summary

Over the past few years, reading achievement test scores in California at the second and third grades have been slightly higher than national norms. Results of 1974-75 testing in the second grade remained at the level of previous years, while results from the third grade showed a slight increase. Reading achievement in the primary grades continued to surpass publisher norms by a small margin.

In the opinion of the Primary Grades Reading Assessment Advisory Committee, California's pupils generally scored well on the Reading Test at both grades two and three. Pupils scored particularly well in phonetic analysis and synonyms, but they did not score as well in structural analysis and denotation (using contextual and syntactical clues from a sentence to derive the meaning of a word). These results may mean that teachers are successfully teaching the recognition of letters and words in isolation but are not placing enough emphasis on using word parts within the structure of a word and on clues to word meanings from the structure of a sentence.

While lower scores in structural analysis and denotation might be expected to be a precursor of lower comprehension skills, comprehension scores at grades two and three were judged to be more than satisfactory by the committee. However, the lower scores may indicate why reading difficulties occur at higher grade levels. The committee feels that the following recommendations might improve scores in structural analysis and denotation:

1. Structural analysis of word parts should receive greater instructional emphasis.

2. Vocabulary instruction should include the use of sentence structure clues to identify the meaning of words in specific contexts.

3. Reading programs should be supplemented with a wider variety of reading matter.

Comparison of Reading Test Results to Those of Last Year

The Reading Test: Second and Third Grades is the instrument used to assess reading achievement at the end of the second and third grades. It was developed for use specifically in California. When the test was first administered in May, 1974, it contained 212 items covering four major content areas: word identification, vocabulary, comprehension and study-locational skills. The test was revised before its second administration in May, 1975.

Content coverage was increased, and the test was lengthened to 250 items; 144 items were common to both versions of the test.

In the 1974 administration of the test, the average percent correct score for second graders was 67; for third graders, 80. In the 1975 administration of the test, the average percent correct scores were 67 and 81 for second and third graders, respectively. However, the test was changed and these results may not be particularly meaningful, since the new test questions could have been harder or easier than the ones they replaced. The significant indicator of change in reading achievement was pupil performance on the 144 test questions that were common to both years' administrations. On these common items, scores for pupils in the second grade remained essentially the same, while scores at the third grade level increased between 1 and 2 percent.

An analysis of subtest scores at the second grade level showed a small gain in 1974-75 in study-locational skills with no change in other subcontent areas. In the third grade, 1974-75 scores were higher than scores in previous years in all areas except word identification, where they were essentially the same. At the third grade level, gains were greatest in comprehension.

The 1974 test performance placed the Reading Test score of the median second grade pupil in California at the 53rd percentile of the national norms provided by the Cooperative Primary Reading Test and at the 52nd percentile in the third grade. Since information on the common items of the two years' test administration indicates no change in second grade performance and a slightly higher performance at the third grade level, it appears that reading achievement in the primary grades in California's public schools continues to surpass publisher norms by a small margin.

Skill Area Results for the Reading Test

A clearer picture of what was measured in the Reading Test can be obtained from Table 1. All the skill areas tested are listed in the table and the reader will find for each skill area a description of the way the skill was measured, the number of test questions included to measure that skill area, data on pupil performance in that skill area, and an illustrative test question. While none of the illustrative test questions was used in the test, all follow the identical format of the items that were in the test and should be of approximately equal difficulty to those in the test.

It will be helpful to refer to this table when reading the discussion and implications of Reading Test results, which follow. Skill areas such as "structural analysis" and "denotation" are discussed, and it is possible to get a better understanding of these terms by reviewing the appropriate sections in the table.

Discussion and Implications of Reading Test Results

The following discussion of the results is based upon the judgment and opinions of the Primary Grades Reading Assessment Advisory Committee. Members of the committee were asked to review the findings and to make

TABLE 1

Reading Performance, by Skill Area, of California Second and Third Grade Pupils, 1974-75

Skill area	Description of skills assessed	Number of Questions	Average percent of questions answered correctly[1]		Illustrative test question[2]
			Grade two	Grade three	
WORD IDENTIFICATION	(Total and averages for word identification skill areas)	(60)	(75)	(86)	
Sight words	The pupil must choose the word that names the object which is pictured.	5	84	93	Teacher says: "Mark the word that goes best with the picture." o spool o spoon o stool
Phonetic analysis	(Total and averages for phonetic analysis skill area, a subcategory of word identification)	(45)	(77)	(86)	
Consonants	The pupil must choose the word that has a letter that is not sounded.	15	74	85	Teacher says: "Mark the word that has a letter that is not sounded." o right o lift o spent
Vowels	The pupil must choose the printed word that has the same vowel sound as the oral stimulus word.	20	80	88	Teacher says: "Mark the word that has the same vowel sound in its middle as the vowel sound in the word run." o cut o ran o fin
Spelling patterns	The pupil must choose the printed word that rhymes with the oral stimulus word.	10	73	85	Teacher says: "Mark the word that rhymes with the underlined word." show o blow o down o cow
Structural analysis	The pupil must identify root words, suffixes, compound words, and contractions.	10	66	81	Teacher says: "Mark the combination of letters that is the correct division of the underlined word." firehouse o fi + rehouse o fire + house o fireh + ouse

[1] The only values presented in this column are averages. The percentages for individual items varied from the average value by 20 or more points.

[2] It is important to remember that these sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

TABLE 1 -- Continued

Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly		Illustrative test question
			Grade two	Grade three	
VOCABULARY	(Total and averages for vocabulary skill areas)	(60)	(68)	(83)	
Denotation	The pupil must choose the response word that best fills the blank in the sentence.	22	69	84	Teacher says: "Mark the word that goes in the blank in the sentence." Father told Pat to _____ the back door. o leave o fast o close
Relational	(Total and averages for relational skill areas, a subcategory of vocabulary)	(38)	(67)	(82)	
Synonyms	The pupil must choose the response word that means the same as the underlined word in the phrase.	24	68	83	Teacher says: "Mark the word that means the same as the word that is underlined." a <u>small</u> dog o cute o little o happy o funny
Antonyms	The pupil must choose the response word that means the opposite of the printed stimulus word.	10	66	78	Teacher says: "Mark the word that means the opposite of the underlined word." <u>light</u> o evening o dark o bright
Homonyms	Although the format of this test item is the same as that used for denotation, the pupil must choose the response word from among three having the same sound.	4	67	82	Teacher says: "Mark the word that goes in the blank in the sentence." We have _____ dogs. o to o too o two

TABLE 1 -- Continued

Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly		Illustrative test question
			Grade two	Grade three	
COMPREHENSION	(Total and averages for comprehension skill areas)	(110)	(61)	(77)	
Literal	Given a passage of printed material, the pupil must choose the correct response to a written question that requires identifying or remembering elements in the passage which were explicitly stated.	77	63	78	Dear Children, I hope that you are having a good time and working hard. I have missed the whole class very much. Miss Smith has been telling me that you have been very helpful to her. Thank you for all your cards and flowers. I have even had a few surprise visits from some of you! I hope to be back as your teacher soon. Until then, your get well cards made me think of you. Your teacher, Mrs. Black What have the children sent Mrs. Black? o cards and telephone calls o cards and flowers o flowers and clothes o food and clothes
Interpretive	Given a passage of printed material, the pupil must choose the correct response to a written question that requires using ideas and information, explicitly stated, to paraphrase, infer from, relate, or generalize from elements in the passage.	33	59	75	Where has Mrs. Black been? o on a trip o teaching in another class o sick o visiting out of town
STUDY-LOCATIONAL SKILLS	(Total and averages for study-locational skill areas)	(20)	(76)	(88)	
Alphabetizing	The pupil must choose which letter or word comes first in alphabetical order.	10	74	88	Teacher says: "Mark the word that comes first in alphabetical (ABC) order." o dent o drive o dart o dog

TABLE 1 -- Concluded

Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly		Illustrative test question
			Grade two	Grade three	
STUDY-LOCATIONAL SKILLS (Cont.)					
Table of contents	Given a table of contents and a page number, the pupil must choose the story that begins on the given page.	10	77	88	Teacher says: "A page number is underlined. Look at the table of contents and then mark the title of the story that begins on the page that is underlined."

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judgments about the quality of the scores, i.e., to compare the results with their expectations drawn from their experience and other sources and to point out any implications for revising or changing the emphases of instructional programs in California. Although the following discussion is based upon a draft written by members of the committee and reviewed by them, the Department edited and revised the draft and therefore must take full responsibility for its final content. Since the judgments made are subjective, it would be surprising if all readers agreed with the logic and conclusions presented. They are offered as one set of "expert opinions." They are not a final consensus, but they should serve as a stimulus to further inquiry and discussion of proper objectives of instructional programs.

Scores on the Reading Test were satisfactory in all major areas at both grade levels. Second graders answered 67 percent of the questions correctly, while the average third grade score was 81 percent. The highest scores were in study-locational skills (76 and 88 percent for the second and third grades, respectively), followed by word identification (75 and 86), vocabulary (68 and 83), and comprehension (61 and 77).

Some areas showed virtual mastery. For example, students in the third grade averaged 93 percent correct responses in sight words; 97 percent, in identifying the consonants with which words began; and 88 percent, in study-locational skills (alphabetizing and using a table of contents). At the second grade, 94 percent of the pupils were able to identify the consonants with which words began.

While reading achievement was generally high, the committee noted two areas in which scores were low: structural analysis and denotation. Weaknesses in these areas may be crucial to later success in reading.

Competency in structural analysis implies that the learner is able to perceive root or base words, the use and meanings of different inflectional endings (such as ed, ing, and s), the meaning-laden prefixes and suffixes of the English language, and compound words (such as playground).

This ability becomes more and more important as pupils face an increasing number of school tasks in which "reading to learn" is crucial. The content fields, such as science, the social sciences, and mathematics, have greater numbers of complex words which have been built by use of combined structural parts than do words which are encountered in primary reading.

Denotation skills, as measured in this test, involves selecting one word from four as appropriate for a blank within a specific sentence. Successful performance of this task requires not only a knowledge of the meanings of the words in the item but also an understanding of the syntactical clues in the sentence. Inability to perform this may lead to subsequent difficulties in comprehension.

Current reading programs in the primary grades in California place emphasis on the learning of decoding skills. These programs should be encouraged to continue, but at the same time additional emphasis needs to be placed on the development of vocabulary skills in pupils by increasing their ability to

identify the meaning of words as used in a specific context. Sentence syntax clues and word structure clues need to be included in the development of this skill. There also exists a need to supplement reading programs so that each pupil has experience with as wide a variety of reading matter and thinking skills as possible.

Word identification skills and vocabulary skills are, of course, both essential to comprehension. Given the weaknesses cited, one might expect comprehension scores for pupils in the second and third grades to be low, but in the judgment of the advisory committee, they are quite satisfactory. One might then ask, "Why be concerned with weaknesses in structural analysis and denotation skills as long as comprehension remains satisfactory?" Weaknesses in structural analysis and denotation are the type of language deficits which, like certain nutritional imbalances, bring trouble only after a long deficit period. We have long been aware of the historic flare-up of reading difficulties at the fourth-grade level, where the curriculum places heavier emphasis on reading in content areas. By emphasizing functional practice of varied sentence patterns, teachers can plan action which will help prevent such problems.

There is an encouraging trend to be noted in comprehension achievement scores from the third-grade testing. Third graders improved significantly over second-grade children in their strength in interpretive reading. This fact is a reminder that thinking, reasoning, solving problems, and making judgments are components of the mature reading process. Evidently primary teachers in California are asking good questions and stimulating children to think as they read.

ACHIEVEMENT IN READING AT GRADES SIX AND TWELVE

Summary

Although many problems are associated with national norms, some of which were discussed on pages four and five, many citizens ask a question whose answer requires a comparison with such norms: How does the performance of California students compare to that of students in the rest of the nation?

For the past few years, reading achievement in California schools has been slightly below national norms at both the sixth and twelfth grades. However, state testing results at grade six show that an upward trend in scores is now apparent; they remain only marginally below national norms. Twelfth grade reading test results are less encouraging when compared to national norms. Although the results in 1973-74 suggested that the drop in scores had been halted, reading test scores again declined for California high school seniors in 1974-75. Details of the study in which California students' performance was compared to a national sample are the subject of the section of this report entitled "Comparisons with National Norms."

An analysis of results on the new Survey of Basic Skills: Grade 6 indicates that California sixth graders read equally well at all levels of comprehension; no comprehension skill was revealed as being notably weak. On the highest and most difficult level of comprehension--critical comprehension--pupil performance was unexpectably high. Additional attention, however, needs to be given to word-forming (using root words plus prefixes and suffixes to form new words), identifying fine shades of word meaning by using contextual clues, and selecting and using reference materials.

An analysis of the results on the Survey of Basic Skills: Grade 12 indicates that students at this level can read well for detail or for detecting the main idea of a passage; however, they encounter difficulty in perceiving cause-and-effect relationships or in predicting outcomes and consequences from material read. Like pupils at lower grade levels, they are able to match a word and its definition successfully but meet difficulty in using clues from context to find the more subtle shades of meaning of a word. Twelfth graders also demonstrated satisfactory achievement in the use of library skills.

Skill Area Results for Grade Six

The reading portion of the Survey of Basic Skills: Grade 6 measures four skill areas: word identification, vocabulary, comprehension, and study-locational skills. Word identification items are designed to measure pupils' ability to identify the sounds of certain letter combinations and to analyze the structure of words--prefixes, suffixes, and root words.

Vocabulary items are designed to measure the identification of word meaning. Comprehension items are designed to measure the understanding of passages. Study-locational skill items are designed to measure the application of reading skills to find appropriate word meanings in dictionaries, to use parts of books to find needed information, and to use library resources in selecting material to find needed information. The 98 reading items are divided equally among the 14 forms of the test.

Table 2 displays the sixth grade pupil reading achievement results for the various skill areas. It includes a name for and description of each skill area, the number of test items measuring that skill, and the average percent of correct responses in that skill area. An illustrative item is also included to help the reader understand the format of a typical item which might be used to measure the skill. It is important to remember that these items are not actual test items; they are included only to demonstrate the skill which is discussed.

On the entire 98-item test, 56 percent of the pupil responses were correct. Performance was relatively even across the four principal skill areas: 51 percent correct responses in word identification skills; 53 percent, in vocabulary; 59 percent, in comprehension; and 55 percent, in study-locational skills.

Discussion and Implications of Grade Six Results

The Reading Assessment Advisory Committee analyzed results of pupil performance on each of the reading items on the Survey of Basic Skills: Grade 6. For the purpose of analysis, items were grouped into the various subcontent and skill areas of reading so the committee members could view the assessment results by meaningful categories. In many cases, the average percent correct response in a category was based upon widely divergent percentages of pupils who answered an item correctly. Committee members then had to use their judgment to discern whether a lower percentage correct on an item, or a category, was due to pupils being deficient in that skill or whether the item was inherently more difficult. In other words, the percentage of correct responses was not the sole basis for the judgments of the committee members. If 70 percent of the pupils answered an alphabetizing item correctly and 50 percent answered a critical comprehension item correctly, the judgment might have been made that pupil performance in the latter case was more satisfactory, considering the difficulty of the skill and the item.

The following analysis of the results of the sixth grade reading assessment represents the judgments of the various members of the committee. The judgments and opinions reflect the collective, representative thoughts expressed by the members of the Reading Assessment Advisory Committee. The Department of Education takes full responsibility for the distilling and arranging of those thoughts into their present written form.

TABLE 2

Reading Performance, by Skill Area, of California Sixth Grade Pupils, 1974-75

Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly[1]	Illustrative test question[2]
WORD IDENTIFICATION	(Total and average for word identification skill areas)	(20)	(51)	
Sound patterns	The pupil must identify the correct sounds of vowels, consonants, and vowel combinations.	14	45	Which word has a sound in it like the sound of the letters underlined in through? The sound is not always made by the same letters. o rough o blew o bought o tough o draw
Prefixes/suffixes	The pupil must identify how prefixes and suffixes change the meaning of a root word.	6	64	The ending of the word biggest makes the word mean: o less big o bigger than o as big as o not so big o most big
VOCABULARY	The pupil must select the meaning of a word as it is used in a paragraph.	12	53	In this story the word principal means the same as: o law o main o headmaster o money
COMPREHENSION	(Total and average for comprehension skill areas)	(55)	(59)	
Literal	After reading a passage, the pupil must identify elements in the material read which have been explicitly stated.	19	62	In the letter to her parents, Carol said that the highway was: o smooth o bumpy o forested o hilly

[1] The only values presented in this column are averages. The percentages for individual items varied from the average value by 20 or more points.

[2] It is important to remember that these sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

TABLE 2 -- Concluded

Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly	Illustrative test question
COMPREHENSION (Cont.)				
Interpretive	The pupil must use ideas and information explicitly stated to paraphrase, infer from, relate, or generalize from elements in material read.	28	56	In the paragraph the author is trying to: o inform o entertain o persuade o share an experience
Critical	The pupil must make an evaluative judgment by comparing ideas or information presented in the selection with external criteria provided by the reader's experience, knowledge, or judgment.	8	64	The above statement: o is true o is about science o should never be made o may be true but includes no information to prove that it is
STUDY-LOCATIONAL	(Total and average for study-locational skill areas)	(11)	(55)	
Alphabetizing	The pupil must arrange words in the correct alphabetical sequence.	3	76	Choose the word that would appear first if the words were arranged in alphabetical order: o about o along o able o also
Selecting references	The pupil must select the appropriate reference source to find information.	3	62	In which of the following books would you look to find the definition of regent? o encyclopedia o almanac o dictionary o science textbook
Using an index	Given an index, the pupil must select the correct page to find a topic.	2	37	Using the index above, on what page would you expect to find out about penicillin? o 48 o 49 o 51 o 73

Word Identification Skills

Two types of skills were tested in word identification: sound patterns and prefixes/suffixes. Only 45 percent of the responses were correct in the section dealing with sound patterns. Further investigation is necessary to determine if this word identification skill represents a deficiency which interferes with comprehension. As students are required to read in additional subject matter areas, knowledge of word parts, such as prefixes and suffixes, becomes more important in providing clues to meaning. On items of this type, 64 percent of the responses were correct. In light of the high utility value of this skill, the test results indicate that word forming and root word skills should receive greater instructional emphasis.

Vocabulary Skills

All vocabulary items on the sixth grade test required the pupil to identify the meaning of a word as it was used in a paragraph. Items of this type require making a fine distinction among alternative definitions, using clues from the context in which the word is used. This skill is an inherently difficult one, so the average 53 percent correct response is not surprising. The performance level, however, does indicate that there is a continuing need for instruction in sharpening knowledge of word meanings through the use of sentence and paragraph context clues.

Reading Comprehension Skills

For the reading comprehension items, 59 percent of the responses were correct. Performance was relatively equal on the three levels of comprehension: literal, interpretive, and critical.

Although based on a smaller number of items, the performance on critical comprehension items was unexpectedly high for this inherently more difficult skill. Analysis reveals no noteworthy differences in pupil performance among the comprehension skills, such as reading a paragraph for details, the main idea, or the author's tone and purpose. In view of the importance of comprehension skills to effective functioning in later formal schooling, continued development of all comprehension skills should be a principal focus of the elementary school curriculum.

Study-Locational Skills

Although there were few items in the study-locational skills area, the performance of sixth grade pupils did vary greatly among the various skills in this general category. In identifying which of four words would come first when alphabetized, 76 percent of the pupil responses were correct. However, in a related skill of using guide words of a dictionary, only 39 percent could choose the page where the word "otherwise" could be found. This could be a handicap in using a dictionary effectively and efficiently.

Likewise, in two items that tested the pupils' ability to use an index, only 37 percent of the responses were correct. Limited, or missing, library facilities in elementary schools undoubtedly handicap pupils in selecting what reference sources to consult for information. Although inadequate facilities inhibit improvement in such skills as selecting proper references, schools should seize the opportunity to improve pupil performance in using classroom reference sources, such as a dictionary.

Skill Area Results for Grade Twelve

The 144 items in the reading portion of the Survey of Basic Skills: Grade 12 measure three skill areas: vocabulary, comprehension, and study-locational skills. Explanations of these skills are included in the introduction to the sixth grade reading test.

The twelfth grade student reading achievement results for the various skill areas are presented in Table 3. It includes a categorical name for and a description of each skill, the number of test items measuring that skill, and the average percent of correct responses in that skill area. An illustrative item is also included to help the reader understand the format of a typical item which might be used to measure the skill. It is important to remember that these items are not actual test items; they are included only to demonstrate the skill which is discussed.

On the entire 144-item test, 72 percent of the student responses were correct. Students were able to handle with equal proficiency each of the three major areas of reading skills measured in the twelfth grade test. In vocabulary, students answered 73 percent of the items correctly; in comprehension, 70 percent; and in study-locational skills, 74 percent. Among the different types of items within each of these areas, however, there were differences that reveal relative strengths and weaknesses in the reading program.

Discussion and Implications of Grade Twelve Results

The Reading Assessment Advisory Committee, which was responsible for establishing the objectives of the reading portion of the new twelfth grade test, had an opportunity to review the assessment results item by item and also to look at the results for clusters of items. The committee members, on the basis of their experience in California schools, judged the adequacy of student performance in light of the difficulty of the skill and the particular items used to measure that skill.

Although the discussion which follows reflects the thoughts of the committee members, the Department takes full responsibility for the content of the report.

TABLE 3

Reading Performance, by Skill Area, of California
Twelfth Grade Students, 1974-75

Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly[1]	Illustrative test question[2]
VOCABULARY	(Total and average for vocabulary skill areas)	(54)	(73)	
Matching a definition with a word	Given a definition, or a word, the student must choose from a list of words the one that is most like that word in meaning.	12	78	The taxable valuation of property o mortgage o assessment o debt o insurance
Meaning of a word in context	Given a word that is used in a passage, the student must choose the meaning of the word as it is used in that context.	32	62	In line 15 of the second paragraph of the given passage, the word "prolong" means: o delay o extend o procrastinate o propel
Antonyms	The student must choose from a list of words the one that is opposite in meaning to a given word.	10	64	The word "obsolete" means the OPPOSITE of: o obey o current o archaic o conditional
COMPREHENSION	(Total and average for comprehension skill areas)	(78)	(70)	
Literal	After reading a passage, the student must identify elements which have been explicitly stated.	32	75	How did the creatures communicate? o by lighting up o by sign language o by thought waves o by changing color o by shaking hands
Interpretive	The student must use ideas and information explicitly stated to paraphrase, infer from, relate, or generalize from elements in material read.	39	70	Select the best title for the preceding news article: o The Environmental Protection Agency o Catalytic Converters o Exhaust Fumes into 1980's o Controlling Exhaust Fumes

[1] The only values presented in this column are averages. The percentages for individual items varied from the average value by 20 or more points.

[2] It is important to remember that these sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

TABLE 3 -- Concluded

Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly	Illustrative test question
COMPREHENSION (Cont.)				
Critical	The student must make an evaluative judgment by comparing ideas or information presented in the selection with external criteria provided by the reader's experience, knowledge, or judgment.	7	46	The earliest that this selection could have taken place was the: o eighteenth century o nineteenth century o twentiety century o The selection gives no clue.
STUDY-LOCATIONAL	The student must be able to select and use reference books and their parts such as a table of contents and an index.	10	74	In the glossary of a book, you would find: o chapter titles o a list of references used by the author o definitions of words used in the book o a list of the charts and tables appearing in the book

Vocabulary Skills

On items requiring students to match a word with its definition, the range of difficulty of the words tested resulted in large differences in the correctness of responses. For example, 93 percent correctly identified fossil; 77 percent, reservoir; and 58 percent, ultimatum. On the average, 78 percent of the responses to this type of item were correct. On items requiring the selection of the meaning of a word as used in a paragraph, students had greater difficulty than they had in matching words with definitions. On the average, students were successful in 62 percent of the cases in determining word meanings from the particular context in which the words appeared. This type of item was more difficult than the matching item because students were required to make finer distinctions in word meanings. For example, when the word perspective was used in a particular paragraph dealing with statistics, students were asked to distinguish among view, context, distance, and outlook in selecting the correct response. The ability to pinpoint the exact meaning of words in a particular context, however, is one of the most important skills to a mature reader.

On a third type of vocabulary item, students were required to choose the response that meant the opposite of the given word. Here, as in the selection of word meanings from context, students experienced difficulty, with 64 percent of the responses being correct. While it is generally recognized that selection of antonyms is a more complex task than identifying word meanings, the difficulty of the words chosen for the test was probably the major reason for the lower score. Again, as in the first type of vocabulary items, the range of correct responses was great. For example, 95 percent identified illegal as being the opposite of lawful while only 31 percent identified prolific as the opposite of barren.

Comprehension Skills

Items that measure comprehension skills can be classified, reported, and studied in a variety of useful ways. Looking at one dimension of reading skills, the observer can identify items according to level of comprehension: literal, interpretive, and critical. The ability to understand literal meaning is essential to successful interpretive and critical reading. Thus, the higher scores on literal comprehension items, where 75 percent of the students' responses were correct, were to be expected. On items that measured interpretive and critical reading skills, 66 percent of the students' responses were correct. These comprehension skills that go beyond the literal meaning of what is read are essential to mature reading, and the state assessment results indicate the need for continuing instructional emphasis on their development.

Another dimension of the test results in the area of comprehension skills relates to the specific task the student is required to do in each of the three reading levels. Students were most successful in identifying the main idea of the passage they read. They correctly answered 78 percent of the items requiring this skill. Students were almost equally successful

in responding to questions about the details of the material read; they achieved 76 percent accuracy with those questions.

Two tasks caused considerably more difficulty for students than identification of main ideas and details. In one of these, students were required to identify the cause or reason, stated or implied, for a particular effect or happening described in the paragraph read. On this type of item, 57 percent of the student responses were correct. In the second of these two more difficult tasks, students were asked to identify consequences or predict outcomes from the material they were given to read. Here students experienced their greatest difficulty, with only 54 percent of their responses being correct.

These test results indicate that although students are mastering well the general area of comprehension, program emphasis needs to be placed on higher level skills. Just as interpretive and critical reading objectives need to be stressed, so do the reading tasks of perceiving cause and effect relationships and of predicting outcomes and consequences. Those who study the reading test results of future years will have to examine in detail the tasks of understanding sequence and of detecting the point of view of the author. All of these skills are crucial to the development of mature and successful readers.

Study-Locational Skills

On items in the test that measured ability to use a table of contents, an index, a glossary, or a bibliography to locate specific information, over 70 percent of the student responses were correct on these tasks, with only small differences among them. Although students apparently are achieving well in the development of study-locational skills, data collected on future state tests should be watched to determine whether any specific skills need more supportive instruction.

SUMMARY OF RESULTS IN READING ACHIEVEMENT FOR GRADES TWO, THREE, SIX, AND TWELVE

Reading achievement of California students in 1974-75 was slightly above the national norms for grades two and three. This advantage was not maintained, however, in grades six and twelve. From these data it seems reasonable to conclude that reading skills are receiving a great deal of instructional emphasis in the primary grades, but that the concerns of other skill and content areas may be replacing the emphasis on reading in intermediate and secondary instructional programs. It is to be hoped that students now in grades two and three will hold on to their strong basic backgrounds in reading and compare favorably with national norming groups when their reading achievement is again assessed in grades six and twelve.

At the second and third grade levels, scores indicate that California children are progressing well in the use of phonetic skills, vocabulary skills, comprehension skills, and study-locational skills. The children in grades two and three, however, have more difficulty with structural analysis (i.e., the analysis of word parts such as roots, suffixes, and compound words) and with denotation (i.e., the identification of word meanings in context) than with other aspects of reading instruction. These results imply that additional emphasis should be given to the study of such word parts as roots, prefixes, suffixes, and inflectional endings and of sentence structure and context clues to meaning.

Although at the sixth grade level achievement appears to be more even across all of the skill areas, performance on items involving prefixes and suffixes was weak. Because knowledge of word parts is often vital to a grasp of meaning in content areas, structural analysis should receive increased emphasis at all levels of instruction. A weakness in this area may be an important factor in the lower comprehension scores in both grades six and twelve.

Two conclusions involving aspects of comprehension were noted for all grade levels. (1) The need for increased emphasis on contextual clues to meaning was documented at grades two, three, six, and twelve. Since reading authorities generally agree about the importance of this skill to reading success, instructional programs should assign a high priority to its development. (2) On the whole, students are more competent on lower level comprehension tasks and less skilled on more abstract complex tasks. In general, literal meanings, main ideas, and supporting details were readily comprehended. As one would expect, interpretive and critical reading skills involving the recognition of cause-and-effect relationships and the prediction and application of outcomes are difficult for students. These results, although not surprising, call for teachers to continue to encourage students to look beyond literal meaning and to stretch their thought processes to take fuller advantage of the power of the written word. Chart 1 summarizes the areas of relative strength and weakness for the four grade levels in reading.

Chart 1

Skill Areas in Reading in Which Performance Has Been Identified as Either Satisfactory or in Need of Improvement

Grade	Performance in skill area[1]	
	Satisfactory	In need of improvement
Two and Three	Identifying sight words Decoding letter-to-sound correspondence Identifying synonyms Literal comprehension Interpretive comprehension	Identifying roots, suffixes, compound words, and contractions Recognizing meaning of words in context
Six	Critical comprehension	Identifying meanings of prefixes and suffixes Recognizing meaning of words in context Selecting and using proper references
Twelve	Matching a word and its definition Literal comprehension Selecting main idea of a paragraph or passage Using reference books	Recognizing meaning of words in context Critical comprehension Perceiving cause and effect relationships in a paragraph or passage Predicting outcomes and consequences from a paragraph or passage

[1] See the document, Test Content Specifications for California State Reading Tests, for additional information about the meaning and definition of the various skill areas.

ACHIEVEMENT IN WRITTEN EXPRESSION IN GRADES SIX AND TWELVE

Summary

In recent years language achievement in California has been below national norms and has shown a slight but steady decline during this period. While this decline continued in 1974-75 for grade twelve by two percentile points, the trend was sharply reversed for grade six where a six percentile point increase occurred. See the sections entitled "Introduction to a New Kind of Testing Report" and "Comparisons with National Norms" for details on national norms.

Under California's revised statewide assessment program, a new test entitled Survey of Basic Skills was administered to all sixth and twelfth grade students in 1974-75, and a portion of the test was used to assess student achievement in written expression. The English Language Assessment Advisory Committee was consulted for its reactions to the statewide performance on the written expression portion of that new test. The committee was generally more pleased with sixth grade performance than with that at the twelfth grade level.

The committee judged that sixth grade performance was at least satisfactory in four subskills: capitalization; selection of word endings within context; discrimination between general and specific words and groups of words; and identification of appropriate words and groups of words. The only sixth grade subskill area identified by the committee as unsatisfactory was the punctuation of contractions, possessives, and parts of an address. Two general trends were suggested from this pattern of strengths and weaknesses:

1. Sixth graders appeared to be stronger on items dealing with concepts than on items dealing with the conventions of written language (such as punctuation).

2. Sixth graders were more successful in dealing with meaningful language in context than in the less meaningful areas, such as word parts in isolation and rules of punctuation.

Areas of twelfth grade performance judged as satisfactory by the committee were as follows: achievement of subject-verb agreement; discrimination between general and specific words; and identification of irrelevant material within paragraphs. Four areas at the twelfth grade level were judged as unsatisfactory: capitalization; punctuation of contractions, possessives, and sentences requiring commas; discrimination between effective, economical

statements and less effective wordier sentences; and identification of effective subordination and coordination of ideas within sentences. The following two conclusions were suggested by this pattern of strengths and weaknesses:

1. As in the sixth grade, students in the twelfth grade appeared to be stronger on items involving concepts, such as identifying irrelevant material in a paragraph, than on items involving conventions, such as applying the rules of capitalization and punctuation. Twelfth grade performance in punctuation and capitalization indicated a distinct deficiency in that area.

2. While twelfth-grade performance indicated strength in such fundamentals as achieving subject-verb agreement within a sentence and cohesiveness and unity within a paragraph, a general weakness was reflected on those test items requiring more linguistic sophistication, such as selecting effective subordination and coordination of ideas within sentences and selecting economical, effective statements rather than wordier, less effective sentences.

Skill Area Results for Grade Six

The written expression section of the Survey of Basic Skills: Grade 6 included 112 items. The 112 items were categorized into these four subcontent areas: sentence recognition and manipulation, 12 items; punctuation and capitalization, 57 items; word forms, 24 items; and language choices, 13 items. Six items were not scored. The skill area of spelling, a separate section on the Survey of Basic Skills, was covered by 56 test items. Those categories consisting of the greatest number of items yielded the most confident conclusions, but all conclusions should be viewed with caution. The reader is also reminded that the sixth grade test of written expression is still in the formative stages. Hopefully, future developments will result in an increasingly program-diagnostic instrument.

The average percent of correct responses for the grade six test of written expression was 59. Table 4 presents a breakdown of test performance. It includes a description of the skill area, the number of items per category, the average percent correct, and an illustrative test item for each subcontent area within the grade six test of written expression.

Discussion and Implications of Skill Area Results for Grade Six

Members of the English Language Assessment Advisory Committee were asked to review the findings and to make judgments about the quality of the scores; i.e., to compare the results with their expectations and to point out any implications for revising or changing the emphases of instructional programs in California. Although the committee's analysis, which follows, is based upon a draft written by members of the committee, the Department of Education

TABLE 4

Written Expression and Spelling Performance, by Skill Area, of California Sixth Grade Students, 1974-75

Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly[1]	Illustrative test question[2]
SENTENCES	(Total and average for sentences skill areas)	(69)	(49)	
Recognition and manipulation	The pupil must select the best sentence or sentence element from several alternatives; identify the verb form which signals agreement with the subject; select the appropriate suffix.	12	56	Fill in the circle next to the best sentence: o My little brother went and broke the lamp o The lamp was broke by my little brother. o The lamp was broken because of my little brother. o My little brother broke the lamp.
Punctuation	The pupil must recognize the conventional uses of the comma, the apostrophe, quotation marks, and question mark.	40	43	Fill in the circle next to the best way to complete the sentence. He said, "Harry _____ where are you?" o Jones o Jones! o Jones? o Jones,
Capitalization	The pupil must recognize that names of people, places, and organizations are capitalized.	17	55	Look at the underlined portion of the sentence for an error. If you find an error in capitalization, fill in the circle corresponding to the letter where the error occurs. If there is no error, mark D. He was inaugurated in New York city as (A) the first (B) chief (C) executive of the United States. o A o B o C o D (No error)
WORD FORMS	The pupil must recognize word meanings, suffixes, and contractions.	24	61	The suffix that changes lion or heir from masculine to feminine is: o -ine o -ess o -ix o -ette

[1] The only values presented in this column are averages. The percentages for individual items varied from the average value by 20 or more points.

[2] It is important to remember that these sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

TABLE 4 -- Concluded

Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly	Illustrative test question
LANGUAGE CHOICES	The pupil must judge appropriateness of words and phrases, identify attitude-conveying words and phrases, and differentiate words and groups of words at varying levels of abstraction.	13	63	Which of the following sentences is most specific? o Mary is working somewhere. o Grandfather is outside. o Aunt Jane is washing the car. o Jack is playing.
SPELLING	The pupil must identify one misspelled word from a list of several words.	56	50	Fill in the circle next to the misspelled word. o embrace o lace o face o All correct

edited and revised the draft to fit the format of this report and therefore must take full responsibility for its content. Since the analysis is based on subjective judgments, it would be surprising if all readers agreed with the logic and conclusions presented. They are offered here as one set of "expert opinions" which may serve as a stimulus to further inquiry and discussion of proper objectives of instructional programs; the opinions do not represent a final consensus regarding the test results.

An analysis of sixth grade performance on the test of written expression indicates the following patterns:

1. Sixth grade performance appeared to be stronger on items dealing with concepts than on items dealing with conventions of written language (such as punctuation).

2. Sixth grade performance was apparently somewhat better on items involving meaningful language usage in context than on items involving less meaningful areas of language, such as isolated word endings or rules governing punctuation.

The Committee's First Conclusion. A large number of punctuation and capitalization items (57) were included in the sixth-grade test of written expression; therefore, the conclusions made for this portion of the test are better substantiated than the conclusions reached for some of the other areas of the test which had smaller numbers of test items. The average percent correct for the 17 capitalization items was 55. Nevertheless, the English Language Assessment Advisory Committee considered most scores on capitalization items adequate for the sixth grade. The committee suggested that some difficulty may have arisen from the students' unfamiliarity with certain geographical place names, such as the "Black Forest."

However, the committee was not as satisfied with sixth grade performance in punctuation. Specifically, performance was below expectation on items involving the correct punctuation of contractions, possessives, and parts of an address. (While sixth graders seemed to be able to recognize the correct punctuation of a simple, direct quotation, they encountered difficulty with the punctuation of an interrupted quotation, a finding which paralleled the expectations of the committee.)

While punctuation emerged as a possible weakness in sixth grade test performance, notable strengths were apparent in certain conceptual areas involving the appropriateness of words and phrases. For example, 83 percent of the students successfully identified the main purpose of a passage; 78 percent, the audience for whom the passage was written; and 70 percent, the function of a key sentence within the passage. Furthermore, sixth graders were generally successful in selecting between the general and the specific in words and groups of words. For example, 75 percent were able to select "fruit" as a more general term than the names of three specific kinds of fruit.

The Committee's Second Conclusion. The test results seem to indicate that sixth graders are more successful in dealing with meaningful language in context than in less meaningful areas, such as word parts in isolation and rules of punctuation. For example, 71 percent of the students were able to select "was" in an item such as:

"There o was not / o wasn't / o was no breakfast,"

which tested for knowledge of standard English usage. Furthermore, 93 percent could select "discovered" rather than "discovery," "discovering," or "discovers" as the appropriate word for the blank in a sentence like this: "They had _____ a new island." The choice of this word is essential to a meaningful rendition of the sentence.

However, pupils encountered difficulty in less meaningful areas such as applying rules of punctuation (already noted above) and analyzing word endings out of context. For example, only 44 percent of the students were able to select the correct ending in an item like this:

Which word tells us that something was 'made dark'?

- o darkened
- o darkly
- o darkness
- o darker
- o darkest

The accompanying chart outlines the pattern of sixth-grade strengths and weaknesses identified by the English Language Assessment Advisory Committee. It distills the previous discussion as a convenience to the reader and is not to be interpreted as a rigid separation of good and bad performance.

Chart 2

Committee Judgments of Skill Area Results

Performance in skill area	
Satisfactory	In need of improvement
Capitalization Selection of appropriate word endings within context Discrimination between general and specific words and groups of words Identification of appropriate words and phrases	Punctuation of contractions, possessives, and parts of an address

Skill Area Results for Grade Twelve

The written expression section of the Survey of Basic Skills: Grade 12 included 81 test items. In addition to the four subcontent areas assessed by the grade six test of written expression, the grade twelve test included a section on paragraphs. As would be expected, the items on the grade twelve test were generally more sophisticated than the items appearing on the grade six test. The 81 items were categorized into these five subcontent areas: sentence recognition and manipulation, 19 items; punctuation and capitalization, 22 items; paragraphs, 14 items; word parts, 5 items; and language choices, 21 items. (The grade six word forms category paralleled the grade twelve word parts category.) The students' skills in spelling were assessed by 54 test items.

As noted for grade six, those categories consisting of the greatest number of items yielded the most confident conclusions; however, the length of a subtest for grade twelve did not necessarily correspond to that for grade six. For example, while word forms was emphasized more for grade six than was word parts for grade twelve, sentence recognition and manipulation was emphasized more for grade twelve than for grade six. Such differences were intended in response to the divergent instructional emphases for the two grades.

Like the sixth grade test, the written expression test for grade twelve is in the formative stages and is evolving into an increasingly program-diagnostic instrument.

The average percent of correct responses for the grade twelve test of written expression was 55. Table 5 presents a more meaningful breakdown of test performance. It includes a description, number of items, average percent correct, and illustrative test item for each subcontent area within the grade twelve test of written expression.

Discussion and Implications of Skill Area Results for Grade Twelve

As in the discussion for grade six, the analysis of the test results for grade twelve was based upon the judgment and opinions of the English Language Assessment Advisory Committee. Members of the committee were asked to review the findings and react to the quality of the scores. Although the following analysis is based upon a draft written by members of the committee, the Department edited and revised the draft to fit the format of this report and therefore takes full responsibility for its content. The opinions presented here are offered as a stimulus to further inquiry into desirable objectives of the instructional programs in California's public schools; they do not represent a final consensus.

An analysis of twelfth grade performance on the test of written expression indicates the following trends:

1. As with students in the sixth grade, students in the twelfth grade appeared to perform better with items involving concepts, such as identifying irrelevant material in a paragraph, than with items involving conventions, such as applying the rules of capitalization and punctuation. Twelfth grade performance in punctuation and

TABLE 5

Written Expression and Spelling Performance, by Skill Area, of California Twelfth Grade Pupils, 1974-75

Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly[1]	Illustrative test question[2]
SENTENCES	(Total and averages for sentences skill areas)	(41)	(49)	
Recognition and manipulation	The student must select the most effective sentence or sentence element; select a verb form that agrees with the subject; identify the best way to combine two or more sentences to show a given relationship.	19	46	Mark the circle in front of the best way of writing the underlined part. On Saturday he bathed the cat, which she needed very badly. o bathed the cat, which she needed very badly. o bathed the cat, which she very badly had need of. o gave the cat a badly needed bath. o gave the cat a bath, being badly needed.
Punctuation	The student must identify the conventional uses of the comma, quotation marks, and apostrophe, colon, or semicolon.	18	48	Select the underlined part that contains an error in capitalization or punctuation; fill in D if there is no error. "It's (A) necessary to find you're (B) report form, (C) Henrietta," stated her boss. o A o B o C o D (No error)
Capitalization	The student must recognize the conventions for capitalization	4	68	Which is the correct way to write the group of words which is underlined. o experience as an errand boy for the East Side Market o experience as an Errand Boy for the East Side Market o experience as an errand boy for the east side Market o experience as an Errand Boy for the east side Market

[1] The only values presented in this column are averages. The percentages for individual items varied from the average value by 20 or more points.

[2] It is important to remember that these sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

TABLE 5 -- Concluded

Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly	Illustrative test question
PARAGRAPHS	The student must identify irrelevant sentences; recognize the best conbination of a series of short, choppy sentences; select a statement that best summarizes one or more paragraphs; recognize logical development, transitional elements, and time shifts within a paragraph.	14	60	Which word in sentence (5) in the passage (not printed here) indicates that the next paragraph will develop another topic? o illnesses o however o since o age
WORD PARTS	The student must interpret a dictionary item, hyphenate a word, interpret word meaning, or alphabetize a series of words.	5	67	silver (sil' ver), n. a soft, white, metallic element, used for coins and articles of plate, etc. The dictionary entry above indicates that silver should be pronounced with the stress: o on both syllables. o on the first syllable only. o on the second syllable only. o between the first and second syllables.
LANGUAGE CHOICES	The student must identify varying levels of abstraction, differentiate attitude-conveying words and phrases, select the most appropriate word for a blank in a sentence, or judge the appropriateness of diction in terms of a given audience.	21	60	Which of the following words or groups of words is most general? o model plane building o hobby o activity o pastime
	The student must indicate whether a word underlined in a sentence is misspelled or correct.	54	61	Jack is an agil gymnast. o Right o Wrong o Don't know

capitalization indicated a distinct deficiency in both areas.

2. Twelfth grade performance indicated student strength in such fundamentals as achieving subject-verb agreement within a sentence and cohesiveness and unity within a paragraph. On the other hand, the test results indicated that students had more difficulty with those items requiring more linquistic sophistication, such as selecting effective subordination and coordination of ideas within sentences and selecting economical, effective statements rather than wordier, less effective sentences.

The Committee's First Conclusion. The sixth grade trend in which performance was stronger in concepts than in conventions continued at the twelfth grade level. By grade twelve, the deficiency in punctuation and capitalization was well established. As in grade six, the performance was higher on the average for capitalization (average percent correct, 68) than for punctuation (average percent correct, 48). However, twelfth grade performance in both areas was below the expectations of the English Language Assessment Advisory Committee. In capitalization, for example, only 65 percent of the twelfth grade students indicated that "a" should be capitalized in "the French alps," and only 66 percent indicated a capital "l" for "lake Louise." In punctuation, even on several apparently easy items, performance was below expectation. For example, only 59 percent of the students recognized an error in the contraction "should'nt" and only 70 percent in "is'nt;" these items were designed to test skills which the majority of the committee expected twelfth grade students to have acquired. Furthermore, the weakness in punctuating possessives, excusable at grade six was hard to justify at grade twelve. For example, 45 percent of the students recognized the correct position of the apostrophe in "children's," and only 13 percent were able to select the correct apostrophe position in an expression like this: "three years' labor." Less than half of the students (45 percent) were able to select "Dear Sir:" as the best salutation for a business letter, and only 55 percent indicated that a comma should be placed after the introductory dependent clause in this sentence: "While other empires have withered, Portugal has prospered."

That twelfth grade students are stronger in conceptual areas than in the conventions was suggested primarily by their successful performance on questions requiring the identification of unrelated sentences in a paragraph. On three such items, 91, 90 and 73 percent responded correctly.

The Committee's Second Conclusion. Twelfth grade performance on items testing subject-verb agreement was considered satisfactory. For example, 73 percent of the students identified the error in a sentence beginning like this: "Forming a square around the statue was large stone benches..." The successful twelfth grade performance on items involving the identification of irrelevant material in a paragraph has already been noted.

However, performance was weak on nine sentence recognition and manipulation items which required finer discriminative power. Six of these items involved the choice of the most effective, economical sentence over wordier, less effective alternatives; the percent responding correctly on each of the six items were: 47, 60, 37, 28, 21, and 41, percentages which speak for themselves. Three items involved the ability to subordinate and coordinate ideas within a sentence to show a given relationship; only 26 percent, 46 percent, and 39 percent of the students were able to respond correctly on these three items. (See Table 5 for an illustrative sentence recognition and manipulation item.)

Therefore, while twelfth graders appear to have mastered some of the basics of sentence and paragraph construction, they have apparently failed to master more refined skills such as the discrimination between less effective and more effective sentences and the subordination and coordination of ideas within sentences.

Effective written expression implies the ability to communicate through writing. It is a complex process that is not well understood. It is hypothesized that the writing act does involve the ability to make critical choices and that, in order for those choices to be good ones, they must be based upon a certain amount of language knowledge, such as an awareness of the conventions, forms, and modes of written expression which are used to communicate most effectively. It would seem that such language knowledge would include (1) familiarity with the agreed-upon conventions of capitalization and punctuation; (2) the discrimination between more effective and less effective forms of expression; and (3) awareness of effective subordination and coordination within sentences. Twelfth grade performance on the test of written expression revealed deficiencies in these three areas.

The following chart outlines the pattern of twelfth grade strengths and weaknesses identified by the English Language Assessment Advisory Committee. It distills the preceding discussion as a convenience to the reader and is not to be rigidly interpreted as a separation of good and bad performance.

Chart 3

Committee Judgments of Skill Area Results

Performance in skill area	
Satisfactory	In need of improvement
Achievement of subject-verb agreement	Capitalization
Discrimination between general and specific words	Punctuation of contractions, possessives, and sentences requiring commas
Identification of irrelevant material within paragraphs	Discrimination between effective, economical statements and less effective wordier sentences
	Identification of effective subordination and coordination of ideas within sentences

ACHIEVEMENT IN MATHEMATICS AT GRADES SIX AND TWELVE

Summary

Over the past few years, pupil achievement in mathematics at grade six has remained steady, with the achievement in 1974-75 showing a slight improvement. However, grade six achievement of California pupils remains slightly below the publisher's spring norms. The achievement scores of grade twelve students in 1974-75 were slightly lower than those of 1973-74, and the achievement at this grade level remains below the publisher's norms.

Since the mathematics tests for grades six and twelve in 1974-75 were not the same as those used in previous years, comparative information relating to specific skills improvement or decline across years was not available. However, in the opinion of the Mathematics Assessment Advisory Committee, which participated in the test development process, sixth graders showed adequate computational and application-related skills with whole numbers, fractions, and decimals. Their performance was also judged adequate in geometric skills related to knowledge of facts and reading of graphs. The committee, however, felt that, on the whole, more instructional emphasis is needed to help pupils recognize equivalent fractions, find lowest common multiples, develop comprehension skills in geometry, use formulas to find area and volume, and comprehend relationships from a graph.

In the opinion of the committee, twelfth graders could adequately work computationally with whole numbers, fractions, and decimals and could solve simple linear equations. The twelfth grade students also performed well in geometric skills and that of reading from a graph. The committee believes that twelfth grade students should be better prepared before graduating from high schools in the areas of geometric concepts and the understanding of measurement concepts. The committee gave the following recommendations aimed at improving mathematics achievement:

1. Place increased emphasis on number theory concepts in grades four through eight to facilitate an improvement in computational skills with fractions.

2. Introduce decimal notation and computation skills in the earlier grades (kindergarten through grade six).

3. Emphasize skills of performing measurements necessary to survive in our world by developing a firm understanding of the underlying concepts of measurement.

4. Emphasize skills related to application of geometric knowledge concepts in sixth grade geometry.

5. Include minimal probability and statistics concepts in the school mathematics curriculum.

6. Increase the emphasis in all areas on problem analysis and problem solving skills in all grades.

7. Make systematic efforts to teach the special skills of reading mathematical material at all grade levels.

8. Increase the use of mathematics laboratory materials to strengthen the students' comprehension of geometric relationships and applications, especially in grades seven through twelve.

Skill Area Results for Grades Six and Twelve

Mathematics tests at grades six and twelve in 1974-75 were different from previous years' tests in several ways. In previous years, the Comprehensive Tests of Basic Skills was used at grade six, and the Iowa Tests of Educational Development was used at grade twelve. Both of these are standardized tests having national norms established by the publishers. The 1974-75 tests, Survey of Basic Skills: Grade 6 and Survey of Basic Skills: Grade 12, were constructed by the California State Department of Education based on the instructional objectives of most California schools.

For the Survey of Basic Skills, normative information corresponding to a national sample was not available; however, a special study conducted by the Department of Education established the performance of California students compared to the publisher's norm. The results of that study are given elsewhere in this report.

The 1974-75 mathematics tests have several features not found in standardized tests. For example, the new tests assess the strengths and weaknesses in California's instructional program through the use of a large number of test items in various skill areas. The mathematics section of the Survey for grade six consists of 168 items, and the Survey for grade twelve consists of 198 items. These items are administered so that each student takes only a portion of these items and yet meaningful results are provided at the school, district, and state levels.

Tables are presented on the following pages which describe skill areas of the grades six and twelve tests and the statewide achievement for those areas. It will be apparent from the tables that essentially the same skills were assessed at both grades six and twelve, except that grades twelve has an additional category of algebraic skills. In grade six some beginning algebraic skills were included in the measurement category. Generally, the basic computational levels are the same at both grade levels; however, concept and application-related skills for grade twelve were consistent with the maturity level of grade twelve students. Due to overlap of content coverage at the two grade levels, some items were used at both grades six and twelve.

TABLE 6

Mathematics Performance, by Skill Area, of California Sixth Grade Pupils, 1974-75

Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly[1]	Illustrative test question[2]
ARITHMETIC SKILLS	(Total number and average for arithmetic skill areas)	(82)	(59)	
Number concepts	(Total number and average for number concept, a subcategory of arithmetic skills)	(24)	(63)	
Number and numeration	The pupil must identify whole numbers, fractions, and decimals; identify place value; and recognize points on a number line.	12	73	What digit is in the tens' place in 4,263? o 2 o 3 o 4 o 6 o I don't know.
Number theory	The pupil must recognize odd, even, prime, and composite numbers; and choose the lowest common multiple or greatest common factor of several numbers.	6	49	What is the greatest common divisor of 8, 12 and 16? o 4 o 8 o 12 o 16
Number properties	The pupil must recognize commutative, associative, and distributive properties of operations on numbers.	6	64	Name the missing number. 6 X 15 = □ X 6 o 9 o 15 o 90 o 540 o None of these
Whole numbers	(Total number and average for whole numbers, a subcategory of arithmetic skill areas)	(20)	(71)	
Computation	The pupil must perform addition, subtraction, multiplication, and division involving whole numbers.	12	79	6003 -209 o 6,794 o 5,894 o 5,804 o 5,794

[1] The only values presented in this column are averages. The percentages for individual items varied from the average value by 20 or more points.

[2] It is important to remember that these sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

TABLE 6 -- Continued

Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly	Illustrative test question
ARITHMETIC SKILLS (Cont.)				
Application	The pupil must apply the four arithmetic operations on whole numbers in solving problems presented in a daily life context.	8	59	Joe packs tomatoes 4 to a box. If he has packed 18 tomatoes, which box is he now packing? o the fourth o the fifth o the sixth o the eighteenth
Fractions	(Total number and average for fractions, a subcategory of arithmetic skill areas)	(18)	(49)	
Computation	The pupil must perform addition subtraction, multiplication, and division involving fractional numbers.	12	50	4 X 4/7 = o 1 2/7 o 2 2/7 o 4 4/7 o 7
Application	The pupil must use the four arithmetic operations on fractions, mixed fractions, or whole numbers and fractions to demonstrate comprehension or ability to solve problems in a daily life context.	6	44	Jack's spelling test had 60 words. He spelled 3/4 of the words correctly. How many words did Jack misspell? o 80 o 45 o 15 o 4
Decimals	(Total number and average for decimals, a subcategory of arithmetic skills)	(20)	(52)	
Computation	The pupil must perform addition, subtraction, multiplication, and division involving decimal numbers.	12	54	62.1 - 41.4 = o 10.7 o 20.7 o 21.7 o 57.06 o Not given

TABLE 6 -- Continued

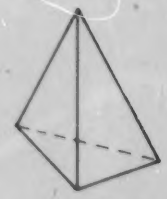
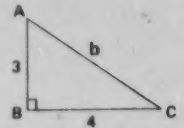
Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly	Illustrative test question
ARITHMETIC SKILLS (Cont.)				
Application	The pupil must use the four arithmetic operations on numbers in decimal form to demonstrate understanding of principles and ability to solve problems in a daily life context.	8	53	The Wards' total expenses during the 8 days at the ranch were $491.60. What was the average cost per day? o $61.45 o $61.32 o $60.20 o Not given
GEOMETRIC SKILLS	(Total number and average for geometric skill areas)	(28)	(43)	
Knowledge of facts	The pupil must be able to identify basic geometric figures.	14	57	 The figure above is called a: o pyramid o prism o cylinder o cone
Application	The pupil must be able to comprehend and apply basic geometric knowledge and concepts.	14	29	 Triangle ABC has a right angle at B. Two of the sides have lengths of 3 feet and 4 feet as shown. How long is the hypotenuse b? o 5 feet o 6 feet o 7 feet o 9 feet o 16 feet

TABLE 6 -- Continued

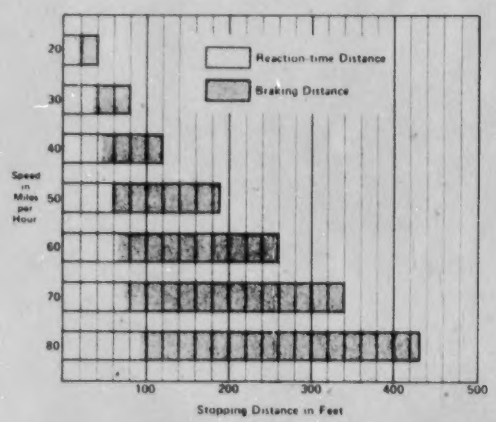
Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly	Illustrative test question
MEASUREMENT AND GRAPHS	(Total number and average for measurement and graphs skill areas)	(44)	(44)	
Knowledge of facts	The pupil must be able to estimate length and volume; convert length, mass, volume, and time from one unit to another unit; perform arithmetic operations on quantities of length, mass, volume, and time.	20	43	3 yards 1 foot = o 4 feet o 7 feet o 10 feet o 13 feet
Application	The pupil must be able to solve problems related to measurement of length, area, mass, and volume.	24	44	HOW MANY FEET BEFORE YOU CAN STOP?  Use the above graph to find the top safe speed for stopping within a maximum distance of 140 feet. o 30 miles per hour o 40 miles per hour o 50 miles per hour o 120 miles per hour

TABLE 6 - Concluded

Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly	Illustrative test question
PROBABILITY AND STATISTICS	(Total number and average for probability and statistics skill areas)	(12)	(26)	
Computation	The pupil must be able to compute probability of simple events and compute the mean, mode, and median of a set of given numbers.	6	29	If an event is certain to occur, then the probability of that event is: o 1/2 o 1 o 100 o zero
Application	The pupil must be able to solve problems related to elementary concepts in probability and statistics.	6	22	A bowl contains one white marble, two red marbles, and three blue marbles. If you were blindfolded and then removed one marble from the bowl, what is the probability that the marble you removed would be red? o zero o 1/3 o 1/2 o 2/3 o None of these

Discussion and Implications of Mathematics Test Results

Members of the Mathematics Assessment Advisory Committee were asked to review the statewide test results and to judge the quality of the statewide mathematics programs. The members were provided with estimated high and low performance values on each item which were derived from the opinions of a limited statewide sample of teachers. In addition, the committee members were provided with the item difficulty values of a substantial number of items which were taken from the pool of publishers' test item banks. However, much of what is presented in this section of this report was drawn from the experience and expectations of these committee members.

Although the committee's assessment of the mathematics test results, which follows, was based upon a draft written by members of the committee and was subsequently reviewed by them, the Department of Education modified the draft to match the format of this report, and the Department takes full responsibility for its final content. Since the committee's judgments were essentially subjective, it indeed would be surprising if all readers agree with the logic and conclusions presented herein. Nevertheless, these are offered as one facet of "expert opinions." The Department hopes this assessment of the test results will serve as a stimulus to further inquiry and discussion regarding the objectives of the instructional programs in California's public schools.

Sixth Grade Test Results

Four skill areas were included in the testing at grade six: arithmetic; geometry; measurement and graphs; and probability and statistics. The statewide scores for each skill area are given in Table 6. The scores are expressed as the "average percent correct" score, which is the average number of items answered correctly by California pupils as a group. Presented another way, this score can be thought of as the number of items answered correctly by an "average" California pupil. The average California sixth grader answered correctly 59 percent of the items in arithmetic skills; 43 percent, in geometry; 44 percent, in measurement and graphs; and 26 percent, in probability and statistics. Overall, the average grade six pupil answered 50 percent of the questions correctly.

Arithmetic Skills. In general, the scores of sixth graders in arithmetic skills indicate a satisfactory level of achievement on items dealing with basic number concepts. These results may mean that teachers in the early grades are teaching successfully the concepts of place value, numerals, and order relationships. The scores also indicate that the pupils have developed good levels of computational skill with whole numbers, fractions, and the addition and subtraction of decimals.

The scores in arithmetic skills were generally not at the expected levels for items dealing with the recognition of equivalent fractions, computations using mixed numbers, division of fractions, applications of percent, and division of decimals. For example, on the average, 32 percent of students could divide 1/2 by 1/6,

and 26 percent could divide 75 by 2.5. Earlier and more consistent development of computational skills with decimals, as recommended in the new state framework in mathematics should help to improve achievement in this area. Computation with fractions usually includes some beginning algebraic skills and number theory concepts. Low achievement results in the area of fractions could indicate a deficit in the development of algebraic skills or number theory concepts. Since working with fractions, mixed numbers, percent, and decimals is the core of consumer math, these skills need to be emphasized in the curriculum.

Geometric Skills. The average percent correct score of 43 in geometric skills was due to the fact that, in general, the items in the test assessed higher level skills. Keeping in view the difficulty level of the items, statewide scores indicate, at best, a moderately successful geometric skills program throughout the state. The scores were high for the items dealing with recognition of common geometric shapes. The scores were particularly low for the items dealing with the application and understanding of geometric relationships. For example, 78 percent of the pupils could identify a pair of parallel lines from several sets of lines, but only 39 percent of the sixth graders could identify two congruent triangles from among several triangles. Better performance on recognition items could be due to increased use of concrete manipulative materials in most of the elementary schools. A low score on geometric relationship items may be due to a tendency of many teachers to skip or treat lightly units in this skill area. Since many problem analysis and problem solving skills in the real world depend upon the ability to perceive and use information derived from geometric shapes, an increased emphasis in this area is recommended.

Measurement and Graphs. The scores on test items in the area of measurement and graphs indicate that except for a few isolated skills, pupils are deficient in this area. Many of the items involved reading mathematical materials and comprehension of specific measurement terminology. Ninety six percent of the pupils were able to read a simple bar graph, and 80 percent were able to identify what change would be returned from a dollar if a person buys a 35-cent notebook. However, the scores were low in items requiring computation with denominate numbers, using conversion factors, using the formulas to compute perimeter, area, and volume of geometric shapes. For example, 27 percent of the sixth graders were able to multiply 4 hours, 10 minutes, and 32 seconds by 3; also, 27 percent knew how many centimeters are in 2 meters and 40 centimeters, and 42 percent knew how to find the area of a square when the dimensions of one of its sides was given.

None of the items in the measurement and graphs skill area required the pupils to perform actual measurements, so it is not possible to assess that skill at this time. Generally, computation with denominate numbers does not receive too much emphasis

in the curriculum at this time. With the exception of measurement of time, the move toward the use of the metric system will gradually eliminate the need to do computations with denominate numbers, and it is not recommended that increased emphasis be placed on measurement skills.

Probability and Statistics. A total of 12 items were used to assess the pupils' skills in probability and statistics. It was not surprising that the scores in this subtest were as low as 26, since it is well known that very little instruction is given in probability and statistics at the elementary school level in California or elsewhere. Given that condition, a score of 26 can be considered satisfactory; however, it is expected that more emphasis will be placed on teaching these skills in California public schools in the future. Probability and statistics concepts are used so commonly in everyday life, e.g., "chances of rain tomorrow," "average rainfall," "per capita income," that beginning concepts should be introduced in school mathematics curriculum at least by the sixth grade level.

Grade Twelve Test Results

The grade twelve mathematics test was composed of five major skill areas: arithmetic skills, algebraic skills, geometric skills, measurement, and probability and statistics. Table 7 describes skill areas and provides the statewide percent correct score for each area. The average percent correct scores were 67 for arithmetic skills, 61 algebraic skills; 64, geometric skills; 60, measurement skills; and 54, probability and statistics. Overall average percent correct score was 64.

Arithmetic Skills. The scores of twelfth graders indicate overall good computational skills with whole numbers, fractions, and decimals. Ninety-seven percent of the students could multiply a three digit whole number by a one digit whole number, 80 percent could multiply 4/9 by 5/7, and 84 percent could add decimals such as 434.7, 0.04, and 7.107. This probably is indicative of the continued emphasis in the instructional program upon these topics in grades seven through twelve. However, the scores were not as dramatic for items requiring division of decimals, addition and subtraction of mixed fractions, and computation with positive and negative numbers. For example, 62 percent of twelfth graders were able to add $1\frac{1}{3}$ and $3\frac{1}{4}$, 58 percent were able to divide 7.08 by 10, and 50 percent could find an equivalent number for $(+4) + (-3) - (7)$.

For applied items involving computation with whole numbers, fractions, and decimals, the scores indicate a good overall achievement. On items involving computation of percent and requiring more than one step, the scores were not as high. For example, only 56 percent of the students could find the answer for this problem: "The discount is 15% of $92.00. What is the sale price?" Increased emphasis should occur in the instructional

TABLE 7

Mathematics Performance, by Skill Area, of California
Twelfth Grade Students, 1974-75

Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly[1]	Illustrative test question[2]
ARITHMETIC SKILLS	(Total number and average for arithmetic skill areas)	(96)	(67)	
Number concepts	(Total number and average for number concepts, a subcategory of arithmetic skill areas)	(28)	(73)	
Number and numeration	The student must identify whole numbers, fractions, and decimals; identify place value; and recognize points on a number line.	14	70	In which numeral is the digit 7 in the tens' place? o 976.3 o 97.63 o 9.763 o 0.9763
Number theory	The student must recognize odd, even, prime, and composite numbers; and choose the lowest common multiple or greatest common factor of several numbers.	8	74	If n is an odd number, what can you say about $n + 1$? o It is always odd. o It is always even. o It is even or odd depending upon what n is. o I don't know.
Number properties	The student must recognize commutative, associative, and distributive properties of operations on numbers.	6	76	$\square \times 7 = (4 \times 7) + (5 \times 7)$ What number goes in the $\square$ above? o 2 o 8 o 9 o 20
Whole numbers	(Total number and average of whole numbers, a subcategory of arithmetic skill areas)	(22)	(79)	
Computation	The student must perform addition, subtraction, multiplication, and division involving whole numbers.	14	87	$\begin{array}{r} 504 \\ -99 \end{array}$ o 405 o 415 o 495 o 505

[1] The only values presented in this column are averages. The percentages for individual items varied from the average value by 20 or more points.

[2] It is important to remember that these sample test items are presented for illustrative purposes only; therefore, they do not cover all of the skills tested, nor do they necessarily possess all the qualities of good test items.

TABLE 7 -- Continued

Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly	Illustrative test question
ARITHMETIC SKILLS (Cont.)				
Application	The student must apply the four arithmetic operations on whole numbers in solving problems presented in a daily life context.	8	64	A parking lot has 25 rows with 18 spaces for cars in each row. If 3 rows are removed for a driveway, what is the greatest number of cars which can be parked on the lot? o 375 o 396 o 414 o 447 o Not given
Fractions	(Total number and average of fractions, a subcategory of arithmetic skill areas)	(26)	(67)	
Computation	The student must perform addition, subtraction, multiplication and division involving fractional numbers.	14	67	4 x 4/7 = o 1 2/7 o 2 2/7 o 4 1/7 o 7
Application	The student must use the four arithmetic operations on fractions, mixed fractions, or whole numbers and fractions to demonstrate comprehension or ability to solve problems in daily life context.	12	67	Jack's spelling test has 60 words. He spelled 3/4 of the words correctly. How many words did Jack misspell? o 80 o 45 o 15 o 4
Decimals	(Total number and average of decimals, a subcategory of arithmetic skill areas)	(22)	(71)	
Computation	The student must perform addition, subtraction, multiplication, and division involving decimal numbers.	14	77	786.4 - 34.87 = o 4.377 o 43.77 o 751.53 o 7,515.3
Application	The student must use the four arithmetic operations on numbers in decimal form to demonstrate understanding of principles and ability to solve problems in daily life context.	8	61	If Beth can drive 18.7 miles on each gallon of gas, how many miles can she drive on 7 gallons? o 126.9 o 130.9 o 140.9 o 1,309 o Not given

TABLE 7 -- Continued

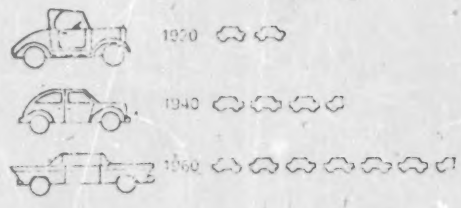
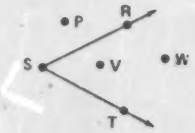
Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly	Illustrative test question
ALGEBRAIC SKILLS	(Total and average for algebraic skill areas)	(32)	(61)	
Computation	The student must be able to perform addition, subtraction, multiplication, and division of algebraic variables; and identify a point shown on rectangular coordinates.	14	66	If $7x - 38 = 18$, then $x =$ o -8 o -5 o zero o 5 o 8
Application	The student must be able to construct an algebraic equation to solve a given problem and be able to interpret tables, charts, and graphs.	18	58	NUMBER OF CARS BUILT IN 1920, 1940, and 1960  Each symbol stands for 1,000,000 cars. According to the graph above, which of the following is the approximate ratio of the number of cars built in 1960 to the number built in 1920 o 2 to 1 o 3 to 1 o 5 to 1 o 6½ to 1
GEOMETRIC SKILLS	(Total and average for geometric skill areas)	(24)	(64)	
Knowledge of facts	The student must be able to identify basic geometric sets and figures	12	78	 Which of the points are in the interior of angle RST? o P only o V only o V and W o R, S, and T

TABLE 7 -- Continued

Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly	Illustrative test question
GEOMETRIC SKILLS (Cont.)				
Application	The student must be able to comprehend and apply basic geometric knowledge and concepts.	12	51	In the plane of a circle with radius 5.04 inches, if a point P lies 5.4 inches from the center of the circle, then P lies: o on the circle o at the center of the circle o outside the circle o inside the circle but not at the center
MEASUREMENT SKILLS	(Total and average for measurement skill areas)	(30)	(60)	
Knowledge of facts	The student must be able to estimate length and volume; convert length, mass, volume, and time from one unit to another unit; and perform arithmetic operations on quantities of length, mass, volume, and time.	12	64	10 decimeters = 1 meter 1000 millimeters = 1 meter The length of a piece of chalk is 0.5 decimeter. What is its length in millimeters? o 0.05 o 5 o 50 o 500
Application	The student must be able to solve problems related to measurement of length, area, mass, and volume.	18	57	A housewife will pay the lowest price per ounce for rice if she buys it at the store which offers: o 12 ounces for 40 cents o 14 ounces for 45 cents o 1 pound, 12 ounces for 85 cents o 2 pounds for 99 cents o I don't know.
PROBABILITY AND STATISTICS	(Total and average for probability and statistics skill areas)	(14)	(54)	
Computation	The student must be able to compute probability of simple events and compute the mean, mode, and median of a set of given numbers.	6	58	Tom, Dick, and Harry lined up to enter their classroom. What is the probability that Tom was the first one in line? o zero o 1/3 o 2/3 o 1 o None of these

TABLE 7 -- Concluded

Skill area	Description of skills assessed	Number of questions	Average percent of questions answered correctly	Illustrative test question
PROBABILITY AND STATISTICS (Cont.)				
Application	The student must be able to solve problems related to elementary concepts in probability and statistics.	8	51	Three of four boys each weighs 60 pounds. What is the weight of the fourth boy if the average of the weights of all four boys is 70 pounds? o 130 pounds o 100 pounds o 80 pounds o 65 pounds

program upon the concepts and applications of percent. It is important that citizens have a reasonably clear understanding of such statements as, "The rate of increase of inflation has decreased by one-tenth of one percent," and they should be able to perform simple calculations involving percents.

Algebraic Skills. The score of twelfth graders on algebraic skills items was an average of 61 percent correct. From the viewpoint that basic algebraic skills are generally harder skills, the statewide instructional program appears to be strong in this area. The students can solve simple linear equations, substitute the values and evaluate an algebraic formula from given numerical values, and name points on a graph. For example, 81 percent of the students could find the value of the unknown in an equation of the type $5x + 4 = 19$, and 91 percent could find the coordinates of a point. These results are probably due to the fact that basic algebraic skills are introduced and used in grades seven and eight and because many students have the opportunity to use the skills in other disciplines in high school. This natural development should be encouraged.

On test items in which students were required to solve "stated" problems involving one unknown and on those items requiring the interpretation of data presented in simple line or bar graphs in tables, the scores were not as high as in other algebraic skills. For example, 37 percent of those tested could approximate the "weight in pounds of 1,000 feet of copper wire having a diameter of 340 millimeters" when they were provided with a chart giving diameter in one column and weight in pounds in another column. Such interpretations are generally encountered in daily life situations when, for example, a person reads the quantity of nutrients listed on a cereal box, or one reads newspaper reports showing "growth or decline of the stock market." A greater instructional emphasis upon the skill of reading and interpreting technical material will equip graduating twelfth graders with desirable life coping skills.

Geometric Skills. The overall value of 64 as the average percent correct responses for geometric skills is indicative of a generally good program in grades seven through twelve. The scores of twelfth graders were particularly high in geometric items dealing with knowledge of facts. Ninety-two percent were able to identify a pair of parallel lines from several sets of pairs of lines, and 83 percent could identify a quadrilateral. These results probably reflect the fact that students are faced with an increasing need to use geometric figures in their daily lives, and hence the need to know about them is more realistic.

As with some other skills, the scores on items involving applications and understandings of geometric concepts were relatively lower than scores on the computational skills. For example, given the value of an interior angle of a triangle, 60 percent were

able to find the value of the exterior angle. Also, 31 percent were able to identify a symmetrical geometric figure from among several geometric figures. In particular, the scores on involving similarity and congruence relationships were low. Because of the importance of these ideas in design, construction, art, and so forth, it is recommended that increased emphasis, especially in grades nine through twelve, be placed on these concepts. A weakness in the ability to perceive and use geometric relationships can also affect problem solving ability in many areas, since many practical problems start with or involve geometric figures as models of the real situation.

Measurement. The students collectively answered 64 percent of the items in measurement skills related to knowledge of facts, and they answered 57 percent of the items in skills related to applications. In view of the general composition of items in this category, California twelfth graders are adequately prepared in skills of basic relations and computations concerned with length, area, and volume. These figures probably support the contention that adequate training in measurement skills occurs in grades seven through twelve and that these skills are reinforced by their use in other disciplines. Seventy-five percent of the students were able to multiply 4 hours, 10 minutes, and 32 seconds by 3; and 76 percent were able to find correctly the area of a square when given the dimensions of one of its sides.

The students' scores on items involving understanding and applications of measurement concepts were not as high as for the items on knowledge of facts. In particular, evidence from the test indicates that an increased emphasis is needed on problems combining several facts and computations. It would also indicate a continuing need to stress problem analysis and problem solving skills in grades seven through twelve. For example, 31 percent of the twelfth graders could answer correctly this question: "If the volume of the rectangular box is 216, what is the area of the shaded face?" With the question, a picture of the box with the values of two of its dimensions was shown.

Probability and Statistics. The students were able to answer collectively 58 percent of the items in computational skills and 51 percent of the items in application-related skills. The students' responses seem to indicate a general lack of familiarity with terminology used in statistics; e.g., median, mean, and range. For example, students seemed to perform better on items using familiar terms such as, "average" than on items using statistical terms such as "arithmetic mean."

The students appear to be familiar with the intuitive approach to probability test items. For example, 70 percent of the students identified "the probability of a spinner stopping on Region 5" when they were provided with a picture of a spinner divided into 6 equal regions. It is difficult to assess whether this high

response was due to an overall good instructional program or was a result of the students' learning the skills in probability in other ways. In any event a good instructional program in basic probability and statistics is essential for students to make a better appraisal of the world around them. Thus, the continued inclusion of probability and statistics in the instructional program is strongly recommended.

The following chart summarizes the areas of relative strength and weakness in the mathematics results for grades six and twelve.

Chart 4

Committee Judgments of Skill Area Results[1]

Grade	Performance in skill area	
	Satisfactory	In need of improvement
Six	Using number concepts; computing whole numbers and fractions; adding and subtracting decimals; recognizing common geometric shapes; and reading a simple bar graph	Recognizing equavalent fractions; adding and subtracting mixed fractions; dividing decimals; geometric application and relationships; using metric conversion factors; using formulas for computing perimeter, area, and volume; interpreting graphs; familiarity with terms like mean, median, and range and their computation; and computing simple probability events
Twelve	Computing whole numbers and fractions; solving simple linear equations; reading data from a table or bar graph; recognizing common geometric shapes and terms; and computing denominate numbers	Adding and subtracting mixed fractions; dividing decimals; using percents; interpreting data read from a table or bar graph; geometric comprehension, using probability and statistical terms and concepts

[1] See the document, Test Content Specifications for the Survey of Basic Skills: Mathematics, for additional information about the meaning and definition of the various skill areas.

RELATIONSHIP OF BACKGROUND FACTORS TO TEST SCORES

The relationships among achievement test scores and a variety of background variables were examined and are summarized here. The variables included such items as socioeconomic status of family, education of parents, and sex of student. It is not possible to determine which variables cause test scores to be high or low from the results reported on this portion of the report. No conclusions about causative relationships should be drawn. Such interpretations could only come after a much more intensive analysis. The comparisons reported here are shown for the interest of the reader, and they suggest areas of investigation which might be useful to pursue.

The relationships of the variables to the scores tended to be quite consistent across grade levels. Because a reporting of such comparisons for additional grade levels would be largely redundant, the accompanying figures graphically portray the findings for grades two and three only. Where results for other grades were different from those of grades two and three, they are noted in the text.

Previous Test Scores

The single highest correlate of test scores at all grades was test scores at previous grades. If students in a school have high test scores at one grade level, they are likely to have high test scores at all other grade levels. None of the variables reported predicted second and third grade Reading Test scores better than Entry Level Test scores did. Similarly, the best predictor of grade six achievement was third grade achievement; the best predictor of grade twelve achievement was grade six achievement.

Socioeconomic Status

Socioeconomic status is the term used to describe the occupational category of the parent or guardian of each student. It was the second highest correlate of test scores at all grade levels. When socioeconomic information was available on a pupil-by-pupil basis, as in the case for grades two and three, the strong relationship between this variable and achievement test scores was readily apparent. The difference in test scores between second grade pupils whose parents were professionals and those whose parents were unskilled workers was 30 points; i.e., more than twice the difference between scores of the average second grader and the average third grader. The test scores of pupils in the second grade whose parents were professionals were higher than those of the average third grader.

Education of the Parents

The parental education variable is very similar to socioeconomic status. Students in schools where the parental education level was high outscored,

by a considerable margin, students in schools where it was low.

Sex of Student

While the relationship of sex to scores is not nearly as great in the variables already cited, test performance did differ for boys and girls. While girls had higher test scores in reading, the difference was greatest in the primary grades; and by the twelfth grade, boys were scoring as well as the girls were. Girls outscored boys in written expression and spelling at both grades six and twelve. While the gap in their performances in written expression shrunk between the two grades, it grew in spelling. In mathematics, boys outscored girls at both grades six and twelve, but the difference at grade six was slight.

Bilingualism

Data concerning whether pupils could speak a language other than English and, if so, what that other language was, were available at grades two, three, and six. The relationship of this variable with test scores was consistent at all grades and in all content areas. Pupils who spoke English only scored higher than the average score for all California pupils. In addition, pupils who spoke fluent English and a second language, other than Spanish, outscored pupils who spoke English only. Pupils who spoke Spanish and fluent English had substantially lower test scores than the average score for all California pupils, and those who spoke Spanish and limited English scored lower yet.

The number of pupils who fell into the "fluent English plus Spanish" and "limited English plus Spanish" categories was quite large. Approximately 10 percent (30,000 pupils per grade) of California's elementary school pupils fall into the former category, with another 2 or 3 percent in the latter. This variable is important to take into account when comparing the results of California's pupils to those of the rest of the nation. For example, while reading achievement of California's second and third grade pupils, on the average, was slightly above national norms, the test scores of pupils who spoke English only far surpassed national norms.

School Size

In the elementary grades, pupils in larger schools tended to have lower scores than those in smaller schools. However, when previous test scores and socioeconomic status were held constant, these differences disappeared. Grade twelve results indicated that students in larger schools tended to get higher test scores than those in smaller schools.

Effect of Midyear Graduation on Test Scores

Midyear high school graduates had slightly lower test scores than June graduates. Many more females than males chose midyear graduation. Most midyear graduates were at the expected age for their grade.

Mobility

While a slight relationship existed between pupil mobility and test scores (pupils who were less mobile had higher test scores), the relationship disappeared almost entirely when other variables, such as socioeconomic status, were accounted for. It seems likely that any correlation between pupil mobility and test scores was due to the fact that schools in higher socioeconomic communities tended to have less mobile student populations.

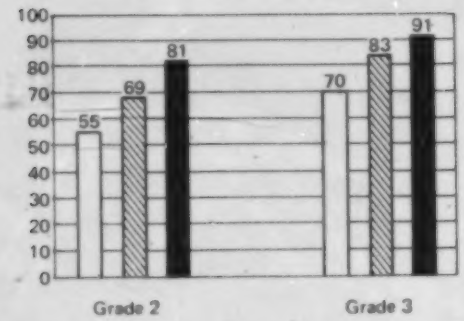
Figure 1

Relationships Between Background Factors and *Reading Test* Scores, 1974-75 in California Public Schools

Average Percent Correct Scores

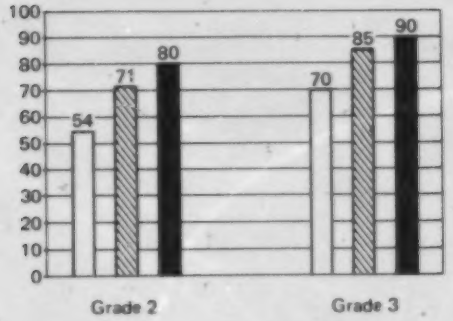
KEY: Low
Medium
High

Socioeconomic Status



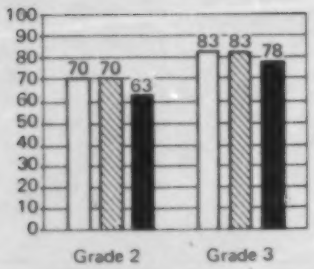
Schools with pupils from families with the highest socio-economic status had the highest *Reading Test* scores.

Entry Level Test Scores



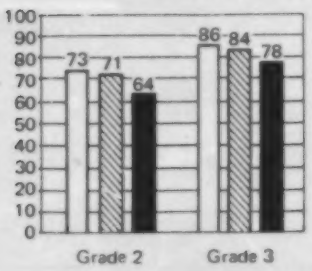
Schools with the highest *Entry Level Test* scores had the highest *Reading Test* scores.

School Size



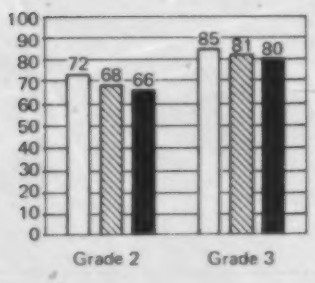
Schools with the largest enrollments had the lowest *Reading Test* scores.

Bilingual Pupils



Schools with the largest percentages of bilingual pupils had the lowest *Reading Test* scores.

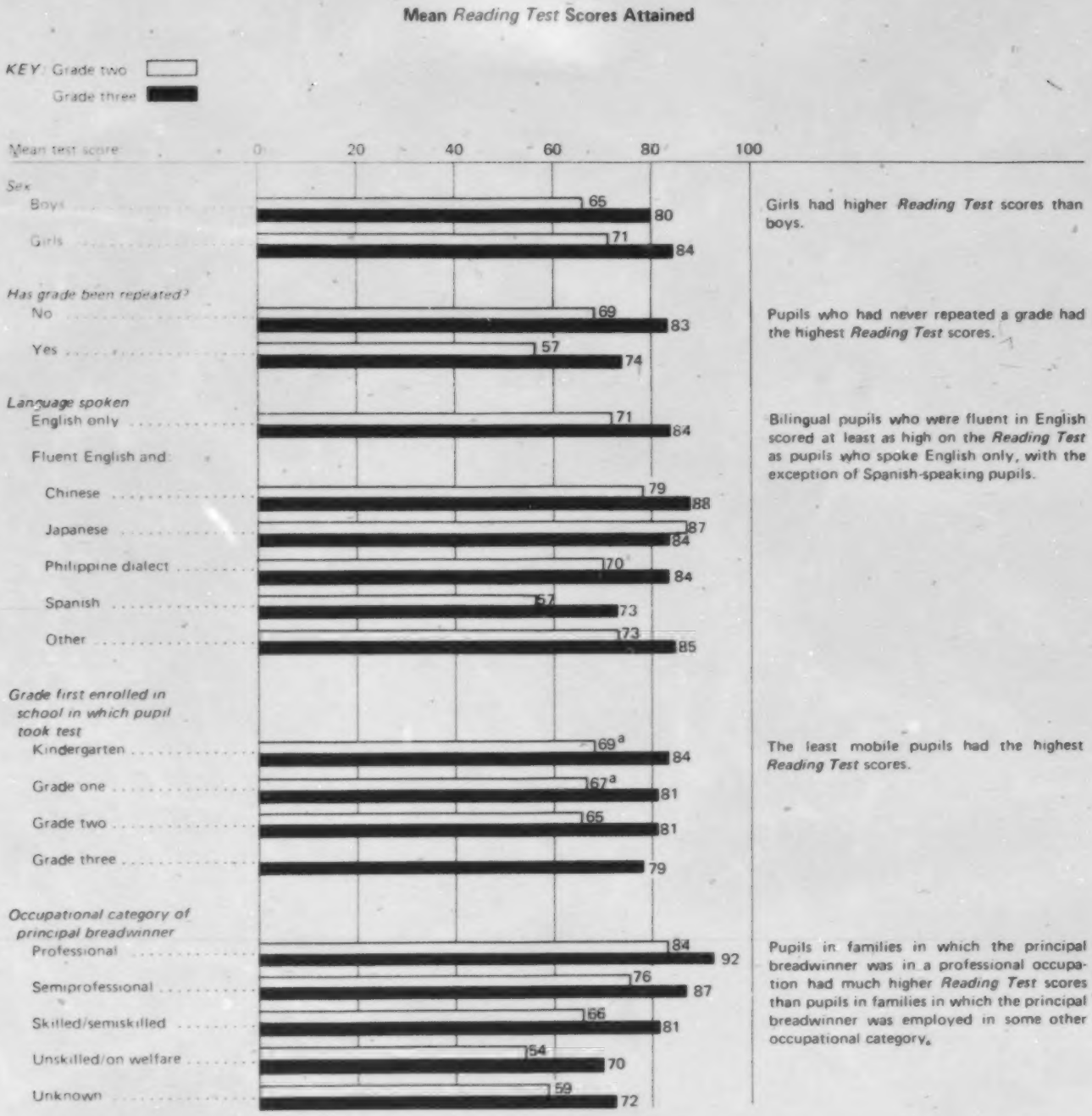
Mobility



Schools with the largest numbers of mobile pupils had the lowest *Reading Test* scores.

Figure 2

Relationships Between Subcategories of Pupils and Mean *Reading Test* Scores, 1974-75 in California Public Schools



[a]This figure should be read as follows: The average test score was 69 percent for pupils who were first enrolled in kindergarten in the school in which they took the test, 67 percent, for those first enrolled in grade one, and so forth.

COMPARISONS WITH NATIONAL NORMS

This section of the report presents information on the comparisons of student performance in California with publishers' national norms.

Comparisons of Results in Grades Two and Three

The new Reading Test for Grades Two and Three was used for the second time in 1974-75. A comparison of pupil performance spanning several years is presented earlier in the section on reading achievement. In the publication Profiles of School District Performance, 1973-74, Statewide Summary, the Department of Education presented the results of an equating study between the Reading Test and the test previously used, the Cooperative Primary Reading Test, as well as two other tests, the Stanford Reading Test and the SRA Achievement Series. The results showed that California scored slightly above the publishers' national averages at both grade levels for all three tests. Since publishers' norms are updated every five to eight years, there was no need to repeat that study this year.

Comparisons of Results in Grades Six and Twelve

The Survey of Basic Skills: Grade 6 and the Survey of Basic Skills: Grade 12, the state developed tests, were used for the first time in the 1974-75 school year. In compliance with the requirements of Education Code Section 12850, studies were made to determine the relationship between the new and the old tests and to show how California students would have scored if they had taken the old tests in 1974-75. In past years the tests in grades six and twelve have been administered to students in the fall of the year. Since the current testing program assesses student performance near the end of the school year, the special studies were carried out to determine the spring 1975 performance of California sixth and twelfth grade students.

Test Results for Grade Six

In grade six, the objective of the study was to determine how California students would have scored on the test used previously, the Comprehensive Tests of Basic Skills, Form Q, Level 2 (CTBS), if all of them had taken it again in 1975. A special sampling study of schools using the CTBS in 1975 was conducted. The study involved the selection of 289 schools which were using the CTBS as part of their regular testing program. Using information about the performance of these schools on the Survey of Basic Skills: Grade 6, it was possible to estimate the statewide performance on the CTBS from the scores of the sample schools. These spring 1975 statewide estimates are presented in Table 8, which also shows the fall performance for the previous five years. Raw scores for the 25th, 50th, and 75th percentiles are given, and these scores are compared with the publisher's percentile rank scores and grade equivalent scores.

The scores of sixth grade pupils in reading, language, and mathematics have been relatively stable in recent years except for a slight decrease in language. The 1975 spring test results show an increase in the raw score values for all of the content areas. These increases have been reflected in higher percentile rank scores. At the median (50th percentile) a 6.5 raw score gain in reading led to a four-point percentile rank increase from 44 to 48. In language a 6.8 raw score increase raised the percentile rank from 37 to 43, a six-point increase; while in arithmetic an 8.7 raw score increase resulted in a percentile rank change from 38 to 44, up by six percentile ranks. Based upon the publisher's spring norms, the performance in reading continues to be better than that for arithmetic and language, with the performance in arithmetic a little better than that in language.

It should be mentioned that only one nationally published test was used at grade six. There is reason to believe that the national norms of the Comprehensive Tests of Basic Skills are representative of national performance. In a special nationwide study conducted for the U. S. Office of Education known as the Anchor Test Study, Educational Testing Service found that the norms of the CTBS closely paralleled those based on a very large and representative sample of all pupils in the nation. The study was specifically designed to equate the norms of seven published tests at grade levels four, five, and six.

Test Results for Grade Twelve

As in grade six, the process of comparing the performance of twelfth grade students to national averages involved the drawing of a special representative sample of students in California, determining their performance on a published test, and generalizing from that sample to statewide performance. As in grade six, the results for these students on the Survey of Basic Skills: Grade 12 were used to ensure the representativeness of the statewide sample.

In the spring of 1975, students in a sample of California high schools were administered the Iowa Tests of Educational Development, Form X-4, (ITED), the test previously administered to twelfth grade students in the fall of the school year. Since the ITED had been normed in the fall of 1962, two other well-known tests which had been normed more recently were also administered in a sample of schools for comparative purposes. These tests were the Sequential Tests of Educational Progress, Series II (STEP), normed in the spring of 1970, and the Tests of Academic Progress, Form S (TAP), normed in the fall of 1970. The scores for California students statewide were estimated from the performance of the students in each sample of schools.

In Table 9 the estimated spring 1975 performance of California students on the Iowa Tests of Educational Development is presented graphically and compared with the fall performance for the past five years. Raw scores for the 25th, 50th, and 75th percentiles are given, and these scores are compared with the publisher's percentile rank scores. The scores of grade twelve students have been drifting lower during the past five years, although the decreases have been so slight in the area of mathematics (quantitative)

that there was no change in the percentile rank score. The performance of California students on the ITED administered in the spring of 1975 indicates that the decline has continued. The raw scores in the spring of 1975 in reading and mathematics are lower than the scores obtained in the fall of 1973, while the raw score for language (expression) rose by .5 of a point. Based upon the publisher's norms, an increase is to be expected in student performance between fall and spring testing in grade twelve. Although the raw score declines were not great over the year-and-one-half span, they resulted in a seven-point decrease in percentile rank scores from 48 to 41 in mathematics, and a six-point decrease from 47 to 41 in reading. The .5 increase in the language raw score was not enough to prevent a decrease in the percentile rank score although the decrease was more modest, from 34 to 32. Among the skills areas, student performance in reading and mathematics are at about the same level, and language continues to remain the weakest area.

In Table 10 the estimated performances of California students on the Sequential Tests of Educational Progress (STEP) and the Tests of Academic Progress (TAP) are given and compared with the publishers' norms groups. These were the two other tests administered in a sample of schools in the spring of 1975 for comparative purposes. California twelfth grade students performed a little more poorly on these more recently normed tests than they did on the Iowa Tests of Educational Development. The pattern of strengths and weaknesses shown in the ITED testing program appears on these tests also. The students' greatest strength is in mathematics, and their weakest area is language. In language the performance of the median (middle) California student is only slightly above what the two publishers expected at the first quartile (25th percentile). For STEP, the percentile rank was 27 while that for TAP was 25. In mathematics, the median California pupil on both tests is below the publishers' norm group but has a higher percentile rank than in reading and language with a 41 for STEP and a 38 for TAP. For reading the median is at the 34th percentile rank for STEP and the 33rd for TAP.

Summary of Comparability Studies

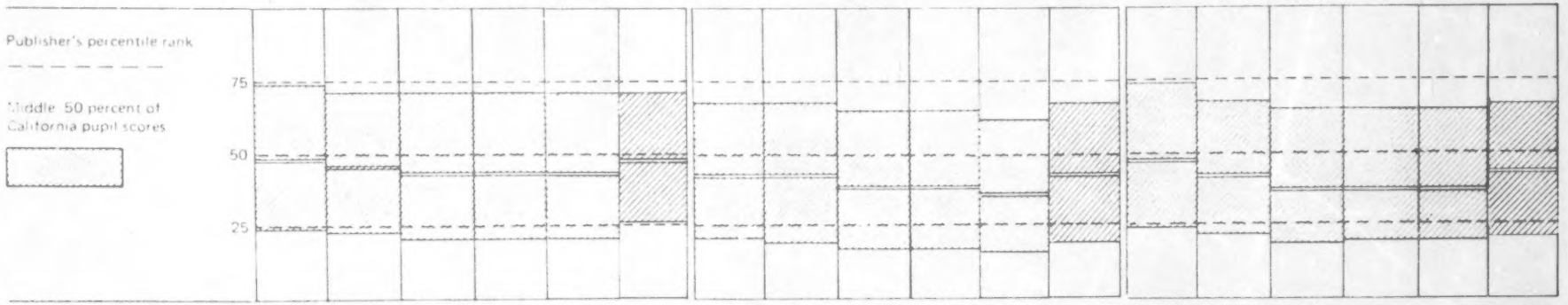
The special comparability studies reported here indicate that in 1975 California pupils in grade six scored slightly higher in all basic skills areas than their counterparts did in 1973-74. Scores of students in grade twelve continued to decline in all areas, with mathematics continuing to be the students' highest scoring area and language skills being the lowest. In spite of grade six increases, students at both grade levels are still scoring below publishers' national norms in all areas.

Table 8

Statewide Standardized Test Results, California Public Schools, 1969-70 Through 1974-75
Achievement Tests, Grade Six

	COMPREHENSIVE TESTS OF BASIC SKILLS, Form Q, Level 2																	
	Reading[a]						Language[a]						Arithmetic[a]					
Year administered	1969-70	1970-71	1971-72	1972-73	1973-74	**1974-75**	1969-70	1970-71	1971-72	1972-73	1973-74	**1974-75**	1969-70	1970-71	1971-72	1972-73	**1973-74**	**1974-75**
Number of pupils tested	328,754	333,734	341,035	342,946	336,054	**21,723**	327,059	331,766	338,749	340,320	332,568	**21,723**	326,901	331,609	339,244	340,778	**333,972**	**21,723**

A. Interquartile Ranges (25th, 50th, and 75th Percentile Scores) Compared to Publisher's Norms[b]



B. Publisher's Percentile Ranks and Grade Equivalent Scores of the State Quartile Scores (25th, 50th, and 75th Percentiles)

75th Percentile (State Q3)																		
State raw score	71.8	71.4	70.5	70.6	70.6	74.4	68.4	67.9	66.5	66.7	66.4	71.3	84.8	83.2	81.5	81.6	81.6	87.3
Publisher's percentile rank	74	72	72	72	72	72	68	68	65	65	62	68	74	68	65	65	65	68
Publisher's grade equivalent	7.6	7.4	7.4	7.4	7.4	7.6	7.2	7.2	7.0	7.0	6.9	7.9	7.3	6.9	6.8	6.8	6.8	7.6
50th Percentile (State Q2)																		
State raw score	61.7	61.2	59.8	60.0	59.9	66.4	58.3	57.5	55.5	55.6	55.1	61.9	74.9	72.6	69.8	70.2	70.2	78.9
Publisher's percentile rank	48	46	44	44	44	48	43	43	39	39	37	43	47	43	38	38	38	44
Publisher's grade equivalent	6.0	5.8	5.7	5.7	5.7	6.6	5.7	5.7	5.4	5.4	5.3	6.2	5.9	5.8	5.5	5.5	5.5	6.4
25th Percentile (State Q1)																		
State raw score	45.7	45.3	43.7	44.3	44.2	53.7	44.3	43.2	41.0	41.2	40.4	48.5	58.9	56.1	52.9	53.6	53.5	65.7
Publisher's percentile rank	24	23	21	21	21	26	21	19	17	17	16	20	24	21	18	19	19	22
Publisher's grade equivalent	4.5	4.4	4.3	4.3	4.3	5.1	4.3	4.2	4.1	4.1	4.0	4.8	4.8	4.7	4.5	4.6	4.6	5.2

[a]Data for 1969-70 through 1973-74 represent fall norms, and the publisher's percentile rank and grade equivalent scores are based upon fall norms. Data for 1974-75 are based upon the performance of pupils tested in the spring of 1975 in a representative sample of California schools. Therefore the publisher's percentile rank and grade equivalent scores for 1974-75 are based upon spring norms. Any comparison of 1974-75 results with earlier years should take this difference into consideration.

[b]The three broken horizontal lines indicate the publisher's 75th, 50th, and 25th percentiles. The shaded columns represent the middle 50 percent of the test scores of California pupils in grade six. The top of each column represents the 75th percentile score for California pupils, the bottom represents the 25th percentile score, and the break in the middle of the column represents the 50th percentile score.

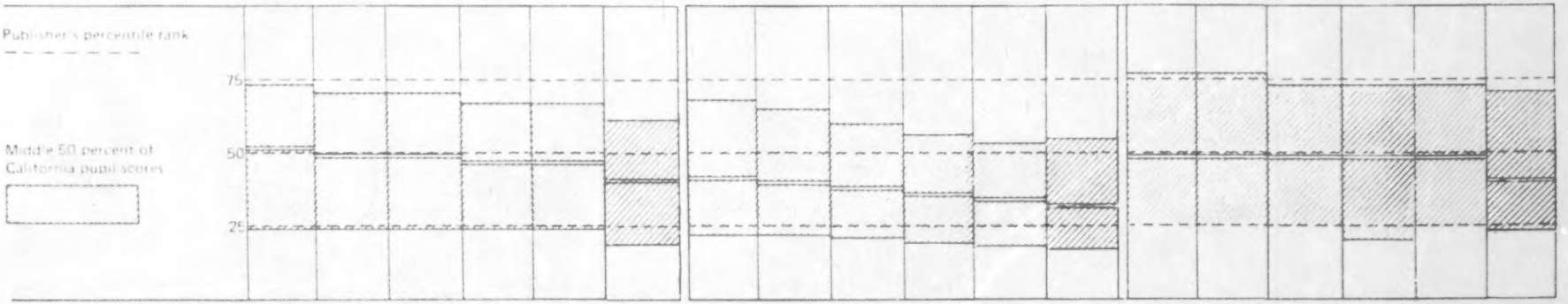
Table 9

Statewide Standardized Test Results, California Public Schools, 1969-70 Through 1974-75
Achievement Tests, Grade Twelve

IOWA TESTS OF EDUCATIONAL DEVELOPMENT, Form X-4

	Reading[a]						Expression[a]						Quantitative[a]					
Year administered	1969-70	1970-71	1971-72	1972-73	1973-74	**1974-75**	1969-70	1970-71	1971-72	1972-73	1973-74	**1974-75**	1969-70	1970-71	1971-72	1972-73	**1973-74**	**1974-75**
Number of pupils tested	234,478	247,311	261,510	251,063	251,355	**3,546**	230,820	246,781	260,812	249,847	249,602	**5,208**	234,706	248,853	262,400	252,778	**252,326**	**4,317**

A. Interquartile Ranges (25th, 50th, and 75th Percentile Scores) Compared to Publisher's Norms[b]



B. Publisher's Percentile Ranks and Grade Equivalent Scores of the State Quartile Scores (25th, 50th, and 75th Percentiles)

75th Percentile (State Q3)																		
State raw score	29.8	29.4	28.8	28.1	27.9	**27.3**	50.8	49.8	48.4	47.3	46.4	**47.8**	19.0	18.7	18.4	18.3	**18.2**	**18.1**
Publisher's percentile rank	74	71	71	67	67	**62**	68	65	60	57	54	**56**	77	77	74	74	**74**	**72**
50th Percentile (State Q2)																		
State raw score	21.5	21.2	20.8	20.2	20.1	**19.4**	40.8	39.9	38.6	37.5	36.6	**37.1**	13.2	12.9	12.8	12.6	**12.6**	**12.4**
Publisher's percentile rank	52	49	49	47	47	**41**	42	40	38	36	34	**32**	48	48	48	48	**48**	**41**
25th Percentile (State Q1)																		
State raw score	15.4	15.1	14.9	14.6	14.5	**13.9**	30.3	29.6	28.6	27.7	27.1	**27.1**	8.8	8.6	8.5	8.4	**8.5**	**8.5**
Publisher's percentile rank	24	24	24	24	24	**18**	22	22	21	19	18	**17**	25	25	25	20	**25**	**23**

[a]Data for 1969-70 through 1973-74 represent fall norms, and the publisher's percentile rank and grade equivalent scores are based upon fall norms. Data for 1974-75 are based upon the performance of students tested in the spring of 1975 in a representative sample of California schools. Therefore the publisher's percentile rank and grade equivalent scores for 1974-75 are based upon spring norms. Any comparison of 1974-75 results with earlier years should take this difference into consideration.

[b]The three broken horizontal lines indicate the publisher's 75th, 50th, and 25th percentiles. The shaded columns represent the middle 50 percent of the test scores of California students in grade twelve. The top of each column represents the 75th percentile score for California students, the bottom represents the 25th percentile score, and the break in the middle of the column represents the 50th percentile score.

Table 10

Scores of California Students on the
Sequential Tests of Educational Progress (STEP)
and the Tests of Academic Progress (TAP)
Compared with the Publishers' Norms

Publishers' Percentile Ranks	Publishers' Percentile Rank Equivalents of State Quartile Scores[1]					
	Reading		Language		Mathematics	
	STEP II	TAP	STEP II	TAP	STEP II	TAP
75th (Third Quartile)	64	64	50	54	68	66
50th (Median or Second Quartile)	34[2]	33	27	25	41	38
25th (First Quartile)	13	10	11	10	19	14

[1]Estimated scores obtained by California pupils at the 25th, 50th and 75th percentile ranks were converted to the publishers' spring percentile ranks.

[2]This number may be read as follows: The score of the average (median) student in California on the STEP II reading test had a percentile rank of 34 [illegible] compared with the publishers' spring norms; i.e., only 34 percent of the students in the publishers' norm group had scores lower than the score attained by the median (middle) California student.